PROCEEDINGS

of the

Twenty-Second Convention

of the

Association of Municipal Electricity Undertakings

of Southern Africa

(Founded 1915)

MUNICIPALITY OF

EAST LONDON

held at

EAST LONDON

From Tuesday, May 11th, to
Friday, May 14th,

1948

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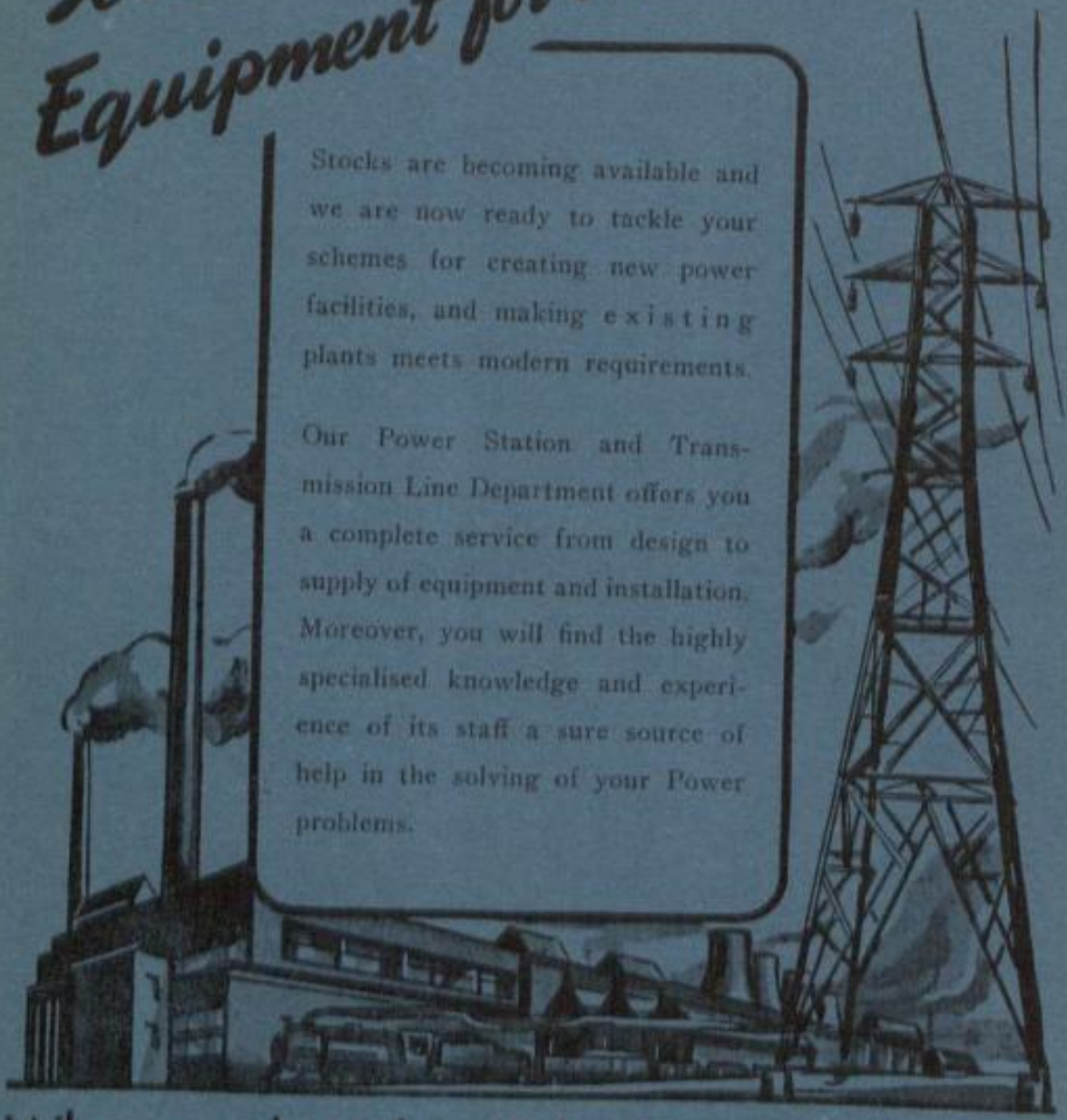

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INDEX OF PROCEEDINGS

GENERAL

PROCEEDINGS

REPORTS

INDEX TO ADVERTISERS

ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS OF SOUTHERN AFRICA

FOUNDED 1915

EXECUTIVE COUNCIL, 1948/9

President:

A. Foden (East London)

Vice-President:

D. A. Bradley (Port Elizabeth)

Past Presidents:

G. J. Muller (Bloemfontein)
C. Kinsman (Durban)

Councillor Members:

East London
Port Elizabeth
Johannesburg (Alternate)
Durban (Alternate)

NOTE: The Town is elected and not the individual Councillors.

Other Members:

D. J. Hugo (Pretoria)
J. C. Fraser (Johannesburg)
H. A. Eastman (Cape Town)
J. C. Downey (Springs)

Secretary and Treasurer:

A. T. Taylor, P.O. Box 7462, Johannesburg

Representatives:

World Power Conference (Local Committee)	H. A. Eastman (Cape Town)
S.A. Standards Institution and S.A. Bureau of Standards	J. C. Downey (Springs) D. J. Hugo, Pretoria (Alternate)
Safety Precautions Committee	J. C. Downey, Springs J. C. Fraser, Johannesburg (Alternate)
Electrical Wiremen's Registration Board	J. C. Fraser, Johannesburg
Overhead Lines Regulations	J. C. Fraser, Johannesburg G. J. Muller, Bloemfontein (Alternate)

Sub-Committees:

Table-Statistics General	G. J. Muller, Bloemfontein C. Kinsman, Durban J. C. Fraser, Johannesburg
Coal Supplies	H. A. Eastman, Cape Town A. Foden, East London D. A. Bradley, Port Elizabeth G. J. Muller, Bloemfontein

PAST OFFICERS AND MEMBERS OF COUNCIL

	Past Presidents:	Secretary and Treasurer:
1915-17	J. H. Dobson, Johannesburg	F. T. Stokes; E. T. Price
1917-19	J. Roberts, Durban	E. Poole
1919-20	B. Sankey, Port Elizabeth	E. Poole
1920-22	T. C. W. Dod, Pretoria	L. L. Horrell
1922-24	G. H. Swingler, Cape Town	H. A. Eastman
1924-26	J. Roberts, Durban	E. Poole
1926-27	B. Sankey, Johannesburg	R. G. Tresise
1927-29	J. M. Lambe, East London	P. Adkins
1929-31	R. Macauley, Bloemfontein	E. Poole
1931-32	L. L. Horrell, Pretoria	E. Poole
1932-34	L. F. Bickell, Port Elizabeth	F. A. P. Perrow
1934-35	A. R. Metelerkamp, Bulawayo	E. Poole
1935-36	G. G. Ewer, Pietermaritzburg	E. Poole
1936-37	A. Rodwell, Johannesburg	E. Poole
1937-38	J. H. Gyles, Durban	E. Poole
1938-39	H. A. Eastman, Cape Town	E. Poole
1939-44	I. J. Nicholas, Umtata	E. Poole until Dec., 1940
		L. L. Horrell, Jan., 1941
1944-45	A. Rodwell, Johannesburg	L. L. Horrell
1945-46	J. S. Clinton, Salisbury	L. L. Horrell to Nov., 1945
	J. W. Phillips, Bulawayo	A. T. Taylor, December, 1945
1946-47	G. J. Muller, Bloemfontein	A. T. Taylor
1947-48	C. Kinsman, Durban	A. T. Taylor

PAST ORDINARY MEMBERS OF COUNCIL

1915-17	J. Roberts, W. Bellad-Ellis, B. Sankey
1917-19	W. Bellad-Ellis, G. Stewart, T. C. W. Dod, T. Jagger
1919-20	W. Bellad-Ellis, G. Stewart, E. T. Prcie, A. S. Munro.
1920-22	L. F. Bickell, T. Millar, L. B. Proctor, E. Poole
1921-24	L. F. Bickell, T. Millar, R. W. Fletcher, J. Roberts
1924-26	T. Jagger, A. S. Munro, T. Millar, L. F. Bickell
1926-27	L. F. Bickell, T. C. W. Dod, T. Millar, E. Poole
1927-29	L. F. Bickell, R. A. Young, T. Millar, E. Poole
1929-30	L. F. Bickell, T. Millar, F. C. D. Mann, G. H. Swingler, A. Rodwell
1931-32	T. Millar, F. C. D. Mann, G. H. Swingler, A. Rodwell
1932-34	T. Millar, J. H. Gyles, G. H. Swingler, A. Rodwell
1934-35	T. Millar, J. H. Gyles, G. H. Swingler, A. Rodwell

Councillors:	Alternate Councillors:	Engineers:
	1935-36:	G. H. Swingler, Cape Town
T. P. Gray, Johannesburg	H. W. Dely, Pretoria	J. H. Gyles, Durban
J. McLean, Port Elizabeth		T. Millar, Harrismith
		E. H. Behrens, Port Elizabeth
	1936-37:	G. H. Swingler, Cape Town
H. Middlebrook, Durban	F. Morrell, Cape Town	T. Jagger, Ladysmith
T. P. Gray, Johannesburg	J. McLean, Port Elizabeth	E. A. Behrens, Port Elizabeth
		G. M. Pirie, Bloemfontein
	1937-38:	L. L. Horrell, Pretoria
H. G. Capell, Durban	H. Middlebrook, Durban	J. S. Clinton, Salisbury
W. James, Cape Town	L. Hofmeyr, Stellenbosch	A. Q. Harvey, Springs
		G. M. Pirie, Bloemfontein
	1938-39:	D. J. Hugo, Pretoria
E. Spilkin, Umtata	G. C. Starkey, East London	J. S. Clinton, Salisbury
W. James, Cape Town	W. Fowkes, Cape Town	A. Q. Harvey, Springs
		G. M. Pirie, Bloemfontein
	1939-44:	D. J. Hugo, Pretoria
E. Spilkin, Umtata	G. C. Starkey, East London	C. Kinsman, Durban
C. Olley, Salisbury	W. Fowkes, Cape Town	A. Q. Harvey, Springs
		G. M. Pirie, Bloemfontein
		W. M. Powell, Bloemfontein
	1944-45:	D. J. Hugo, Pretoria
H. H. Verity, Johannesburg	H. E. Gearing, Cape Town	C. Kinsman, Durban
C. Olley, Salisbury	R. M. Thomas, Durban	J. C. Fraser, Johannesburg
		G. R. E. Wright, Benoni
	1945-46:	D. J. Hugo, Pretoria
J. Ohlsen, Bulawayo	M. Jaffray, Salisbury	C. Kinsman, Durban
J. W. du Plessis, Bloemfontein	E. Boylan, M.P.C., Jo'burg	J. C. Fraser, Johannesburg
		G. R. E. Wright, Benoni
	1946-47:	D. J. Hugo, Pretoria
P. J. C. du Plessis, M.P.C. (Bloemfontein)	A. Immink, Johannesburg	J. C. Fraser, Johannesburg
Major J. Raftery, J.P., M.P.C. (Durban)	A. Z. Berman, Cape Town	J. C. Downey, Springs
		D. A. Bradley, Port Elizabeth
	1947-48:	
Major J. Raftery, J.P., M.P.C. (Durban)	J. M. Preller, Pretoria	D. J. Hugo, Pretoria
		J. C. Fraser, Johannesburg
E. H. Tiddy, East London	C. G. Thompson, Johannesburg	J. C. Downey, Springs
		H. A. Eastman, Cape Town

RULES AND CONSTITUTION

ASSOCIATION OF

Municipal Electricity Undertakings

OF SOUTHERN AFRICA

1. TITLE

The name of the Association shall be "The Association of Municipal Electricity Undertakings of Southern Africa."

2. OBJECTS

The objects for which the Association is formed are:—

(a) To promote the interests of Municipal Electricity Undertakings.

(b) To bring Municipal Electrical Engineers and Chairmen and Members of Municipal Electricity Committees together.

(c) To arrange and hold periodical meetings for the reading of papers and discussions of subjects appertaining to Municipal Electricity Undertakings.

(d) To take such action as may be lawful and expedient for the protection and defence of the rights or interests of Municipal Electricity Undertakings.

3. MEMBERSHIP

The Association shall consist of:—

(a) Honorary Members.
(b) Councillor Members.
(c) Engineer Members.
(d) Associate Members.
(e) Associates.

All Hon. Members and Members of the Association of Municipal Electrical Engineers shall ipso facto become Hon. Members and Engineer Members of the Association of Municipal Electricity Undertakings and existing Associate Members shall be eligible to transfer to the class of Associate.

4. QUALIFICATIONS

The qualifications for admission to the Association shall be as follows:—

(a) **Honorary Members** shall be distinguished persons who are or who have been intimately connected with Municipal Electricity Undertakings and whom the Association especially desires to honour for exceptionally important services in connection therewith.

(b) **Councillor Members.** The Member whose Chief Electrical Engineer shall have qualifications acceptable to the Council shall be the Committee appointed by the Municipality or Local Authority to have control over its Electricity Undertakings and shall be represented as regards its qualifications to vote by one member of such Committee.

(c) **Engineer Members.** The Member shall be the Chief Electrical Engineer engaged on the permanent staff of an Electricity Undertaking owned by a Municipality or Local Authority and who has had a thorough training in electrical engineering and is otherwise acceptable by the Council of the Association. After 1st June, 1947, one only duly qualified assistant in an undertaking with sales of over 20,000,000 units per annum may also be admitted to this class on the recommendation of the Chief Electrical Engineer.

(d) **Associate Members.** The member shall be a Technical Assistant engaged on the permanent staff of any Electricity Undertaking represented by its Councillor Member and/or Engineer Member.

(e) **Associates.** Any member resigning from the class of Engineer Member or Associate Member shall be entitled to apply for transfer to the class of Associate. An Associate may also be an Engineer in the employ of an Authorised Electricity Undertaker other than a Local Authority who is engaged in the supply of electricity to consumers in the area of jurisdiction of a Local Authority.

5. ADMISSION OF MEMBERS

(a) The election of Honorary Members and other classes shall be vested in the Council.

(b) Councillor Members may be admitted on an application signed by the Town Clerk of the Municipality or Local Authority concerned.

(c) Every candidate for election into the Association as Engineer Member shall make application on the prescribed form suitably endorsed by two supporters who shall be either Engineer Members, Councillor Members or Members of the Committee of the Municipal or Local Authority in charge of the Electricity Undertaking of which the applicant is Chief Electrical Engineer.

(d) Every candidate for election into the Association as Associate Member or Associate shall make application on the prescribed form suitably endorsed by the Engineer Member on whose staff he is engaged.

(e) Every candidate for transfer to the class of Associate shall make application in writing for transfer.

6. CONTRIBUTIONS

Contributions shall become due and payable annually on the 1st day of September which shall constitute the new financial year of the Association.

(a) **Honorary Members** shall not be required to pay any contribution.

(b) **Councillor Members.** In the case of the Committee appointed by a Municipality or Local Authority to have control over the Electricity Undertaking, the undermentioned scale of contributions shall apply:

SCALE OF CONTRIBUTIONS

Up	to	½	million	units	4	guineas
½	„	1	„	„	6	„
1	„	10	„	„	8	„
10	„	50	„	„	12	„
50	„	100	„	„	14	„
100	„	200	„	„	16	„
200	„	300	„	„	18	„
Over		300	„	„	20	„

(c) **Engineer Members.** The contribution of an Engineer Member in the service of a Committee making a contribution shall merge into and form part of such contribution. When a Committee is not a Member or resigns from membership, the Engineer Membership contribution shall be two (2) guineas.

(d) **Associate Members and Associates.** The contribution of Associate Members or Associates shall be one (1) guinea.

Part Year Contribution. All members shall pay the contribution for the year in which they are elected without reference to the period of the year at which their election takes place and they shall be entitled to receive a copy of the Proceedings or any other publication issued during such year.

Arrear Contributions. No class of member whose contribution is six months in arrear shall be entitled to attend or take part in any of the meetings of the Association or to receive any of the Association's publications.

Any class of member whose contribution is in arrear at any Convention shall deem to have forfeited claim to membership and his name may, by the Council, be removed from the register of the Association, but he shall, nevertheless, be liable for such arrears up to the date of his name being removed.

7. COUNCIL

Management. The affairs of the Association shall be managed by the Council, who shall have power to incur any expenditure necessary for the objects of the Association.

Members of the Council. The Council shall consist of a President, Vice-President, two Immediate Past Presidents, all of whom shall be Engineer Members and six other members, two of whom may be Councillor Members.

Officers of Council. The officers of the Council shall be President, Vice-President, Secretary and Treasurer.

Election of Council. The officers and members of the Council (other than the Secretary and Treasurer) shall be elected by nomination and ballot at the Convention, and shall hold office until the next Convention. In the event of a vacancy occuring during the year the remaining members shall have power to appoint a member to fill the vacancy.

Co-option. The Council shall have power to co-opt any members of the Association or other persons for any special purpose whose services in their opinion may advance the objects of the Association.

Election of Secretary and Treasurer. The Council shall appoint and from time to time determine the remuneration (if any) and prescribe the duties of the Secretary and Treasurer who shall hold office during the pleasure of the Council.

8. MEETINGS

Council. The Council shall meet as often as the business of the Association may require and at any meeting three shall constitute a quorum.

Convention. The Association shall hold Conventions yearly (of which the local Press of the town in which the Convention is held shall be given full particulars) as far as may be conveniently arranged, and at that meeting the Secretary and Treasurer shall present the Report and Balance Sheet of the Association for the immediate past period.

Quorum. At any meeting of the Association 15 shall form a quorum.

Chairman. The President shall take the Chair at all meetings of the Association, the Council and the Committees, at which he is present, and shall regulate and keep order in the proceedings.

In the absence of the President, it shall be the duty of the Vice-President to preside at the meetings of the Association, and to regulate and keep order in the proceedings. But in the case of the absence of the President, and of the Vice-President, the meeting may elect any member of the Council or, in the case of their absence, any member present to take the Chair at the meeting.

Resolve into Committee. The Association shall reserve to itself the right to resolve itself into Committee at any time during its proceedings; moreover, it shall be competent for any member to have his paper read and discussed in committee if he so desires.

Sectional Voting. When a motion is before any Convention or meeting of the Association it shall be competent for any member of either the Councillor or Engineer sections to apply to the Chairman for a "Vote by Section." This application shall be granted by the Chairman, whereupon each of these sections shall vote separately on the motion and unless a majority shall be obtained in each section, the motion shall be lost. On a sectional vote being called for, Associate Members and Associates shall not be entitled to vote.

MEMBERS, DELEGATES AND VISITORS ATTENDING THE CONVENTION
COUNCILLORS AND ENGINEERS

ALBERTON
- Cr. J. Schoeman
- C. E. Gregor

BARBERTON
- P. C. Asselbergs

BENONI
- Cr. G. Walmsley
- R. Tarran

BETHLEHEM
- K. M. Fisher

BOKSBURG
- Cr. P. A. Venter
- E. L. Smith

BLOEMFONTEIN
- G. J. Muller

BRAKPAN
- Cr. S. J. Thomas
- Cr. W. J. Ebertson
- P. L. Vergottini

BULAWAYO
- Cr. G. W. Liddell
- A. R. Sibson

CAPE TOWN
- Cr. Major J. W. O. Billingham
- H. A. Eastman

CRADOCK
- Cr. G. L. Era Venter
- A. Rossler

DURBAN
- Cr. J. Raftery, J.P., M.P.C.
- C. Kinsman

EAST LONDON
- Cr. D. Lazarus, J.P. (Mayor)
- Cr. E. H. Tiddy (Deputy Mayor)
- Cr. E. J. Evans
- Cr. W. W. Patterson
- A. Foden
- P. A. Giles

EDENVALE
- Cr. J. P. Bezuidenhout
- R. W. Barton

FORT BEAUFORT
- J. H. Rogers

GEORGE
- P. H. Newcombe

GRAAFF-REINET
- Cr. G. B. Minnaar
- V. E. O. Barratt

GRAHAMSTOWN
- J. Iverach

GREYTOWN
- J. S. Craig

GWELO
- A. Hadfield

HARRISMITH
- J. T. Williams

JOHANNESBURG
- Cr. C. G. Thompson
- Cr. J. Lamberton
- J. C. Fraser

KIMBERLEY
- Cr. J. D. Baxter
- C. R. Burton

KLERKSDORP
- Cr. W. C. Aldred (Mayor)
- J. M. Gericke

KROONSTAD
- Cr. Dr. F. A. S. van Reenen
- W. Rossler

KRUGERSDORP
- Cr. W. B. Jackson
- J. L. van der Walt

LADYSMITH (Natal)
- Cr. H. Quick
- Frank Stevens

MAFEKING
Cr. C. J. Truscott
G. E. H. Jones

MIDDELBURG (Transvaal)
H. A. McIntyre

MOSSEL BAY
G. S. Fainsinger

NELSPRUIT
Cr. C. S. I. Russell
R. R. Lyall

N'DOLA
J. H. White

NIGEL
H. Bickley

ODENDAALSRUS
N. Ferreira

OUDTSHOORN
C. H. Adams

PIETERSBURG
I. J. Inglis

PIETERMARITZBURG
Cr. P. E. Sax Young
F. G. McDonald

PIET RETIEF
T. M. Mocke

PORT ELIZABETH
Cr. J. C. K. Erasmus, J.P.
D. A. Bradley

POTCHEFSTROOM
Cr. H. Holtzhausen
Cr. W. Havenga
T. Kramer

PRETORIA
Cr. J. M. Preller
J. Wilson

QUEENSTOWN
T. P. Ashley

RANDFONTEIN
Cr. Mrs. J. C. E. Stoffberg
J. R. Cherry

ROBERTSON
Cr. J. E. N. de Jong
G. Aalbers

ROODEPOORT-MARAISBURG
Cr. D. A. Stumke
H. L. Groom

RUSTENBURG
Cr. W. P. Anderson
P. A. Meintjes

SALISBURY
Cr. Morton Jaffray (Mayor)
Cr. R. M. Cleveland
J. E. Mitchell

SPRINGS
J. C. Downey

STANGER
C. H. Dwyer

STELLENBOSCH
Cr. P. J. S. de Wet
R. W. Ritson

UITENHAGE
Cr. J. B. Jansen
J. A. Mathews

UMTATA
I. J. Nicholas

VEREENIGING
Cr. H. W. Kruger
C. B. Foley

VREDE
Geo. Mossop

VRYBURG
P. C. Grandin

WORCESTER
Cr. A. N. Field
W. Theron

OTHER MEMBERS

W. M. Andrew, King William's Town (Associate)
Frank Castle, Cape Town (Associate)
J. S. Clinton, Johannesburg (Associate)
D. J. R. Conradie, Ficksburg (Associate)
L. L. Horrell, Pretoria (Hon. Member)
B. Marchand, Witbank (Associate)
W. Mortimer Mail, Kokstad (Associate)
G. C. Theron, Van der Bijl Park (Associate)

DELEGATES
GOVERNMENT DEPARTMENTS

W. H. Milton, Electricity Supply Commission, Johannesburg.
G. H. Dalton, Chief Electrical Engineer, S.A.R. & H.
H. Mill, Div. Engineer, Posts & Telegraphs, Port Elizabeth.
H. O. Smith, Chief Inspector of Factories and Chairman, Wiremen's Registration Board, Pretoria.
Chas. H. Clutterbuck, Electricty Control Board, Pretoria.
J. J. de Haas, Public Works Department, Pretoria.
L. McNally, S.A.R. & H., East London.
H. M. McKenzie, Inspector of Factories (Engineering), East London.

OTHER REPRESENTATIVES

J. Russell, S.A. Institute of Electrical Engineers, Johannesburg.
R. J. P. Green, V.F.P. and S.A. Standards Institution, Johannesburg.
J. Ritchie, Director, S.A. Bureau of Standards, Pretoria.
G. S. Clarke, S.A. Bureau of Standards, Pretoria.
T. L. Gillespie, Johannesburg Chamber of Commerce, East London.
P. N. Lategan, Transvaal Coal Owners' Association, Johannesburg.
D. A. D. Adams, S.A. Broadcasting Corporation, Grahamstown.
A. Nimmo, Industrial Development Corporation of S.A. Ltd., Johannesburg.
E. W. Kohler, East London Chamber of Commerce, East London.
G. Berlyn, Border Chamber of Commerce.

VISITORS

J. W. Scheepers, Chief Magistrate, East London.
D. McDonald, System Manager, S.A.R. & H., East London.
C. Shewry, Telephone Engineer, East London.
Clive Gilbert, Divisional Council, East London.
P. Moorshead, Chairman, Divisional Council, East London.
Major W. B. Lansdell, Commissioner of Police, East London.

VISITORS—(Continued)

E. McWilliam, Electricity Department, Pretoria Municipality.
S. G. Redman, Merz & McLellan, Johannesburg.
G. Drewett, Johannesburg.
D. Sinclair Smith, Medical Officer of Health, East London.
H. H. Driffield, Town Clerk, East London.
A. P. Laing, City & Water Engineer, East London.
J. K. Ryan, City Treasurer, East London.
C. J. W. Turner, Transport Manager & Engineer, East London.
A. Clarke, Stores Controller & Buyer, East London.
Capt. M. Kenny, Chief Officer, Fire Department, East London.
K. G. Johnstone, Distribution Staff, Electricity Dept., East London.
H. R. L. Curry, Generation Supt., Electricity Supply Commission, East London.
G. H. Taylor, Chief Clerk, Electricity Department, East London.
W. Bellad-Ellis (Foundation Member of Association), East London.
G. H. Sandys, Technical College, East London.
V. A. Barber, East London, (Editor, East London Dispatch)
D. Marais, East London (Editor, Saturday Post)
D. A. Dersley, Secretary, East London Electrical Employers' Association.
John Ward, Hubert Davies & Co., Ltd., East London.
J. C. Robertson, Cape Town.

REPRESENTATIVES — ENGINEERING COMPANIES

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African Cables Ltd.	V. H. Woods, Vereeniging.
Aycliffe Industries Ltd.	R. C. Walker, Johannesburg.
Babcock & Wilcox of Africa (Pty.) Ltd.	K. M. Johnston, Johannesburg.
Brush S.A. (Pty.) Ltd.	Joseph White, R. W. Wright, Jo'burg.
British General Electric Co., Ltd.	S. G. Mortimer, Johannesburg.
British Insulated Cables (S.A.) Ltd.	A. L. Sanders, A. W. Allen, Johannesburg.
Enfield Cables (S.A.) (Pty.) Ltd.	A. E. Torrance, Johannesburg. A. Stanley Paice, Cape Town. J. P. Thomas, Durban.
English Electric Co., Ltd.	G. V. Jackson, W. G. H. Jarvis, Jo'burg.
Evans, Barnes & Fitz (Pty.) Ltd.	E. H. Fitz, East London.
Fraser & Chalmers (S.A.) Ltd.	H. D. T. Harris, Johannesburg.
General Motors (S.A.) Ltd.	Eric W. Ramsay, R. T. Park, P.E.
Hubert Davies & Co., Ltd.	W. N. Powell, Johannesburg.
International Combustion S.A. (Pty.) Ltd.	A. R. Nothard, Johannesburg.

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Metropolitan-Vickers Electrical Export Co., Ltd.	J. Monks, R. G. Hunter, Johannesburg.
Morris & Martin Ltd.	J. A. England, Port Elizabeth.
C. A. Parsons (S.A.) Ltd.	G. W. Gelling, T. R. Strawson, Jo'burg.
Reunert & Lenz, Ltd.	A. Morcom, R. A. E. Denton, E. J. McKechnie, Johannesburg. C. R. F. Taylor, London.
A. Reyrolle & Co., Ltd.	C. E. R. Langford, Johannesburg.
S.A. Cable Makers Association	E. R. J. Smith, Johannesburg.
S.A General Electric Co., Ltd.	J. W. Allen, Port Elizabeth.
Stamcor (Pty.) Ltd.	J. M. Taylor, Johannesburg.
Standard Telephones & Cables, Ltd.	Geo. Poole, J. O. McNeil, Johannesburg.
Stewarts & Lloyds S.A., Ltd.	F. Kempster, East London.
Trevor Williams Arthur, Ltd.	C. L. de Beer, Johannesburg.
Urquhart & Co. (Pty.) Ltd.	R. T. Urquhart, Johannesburg.
Wilson & Herd, Ltd.	R. W. Hayman, Johannesburg.
Wright Distributors (Pty.) Ltd.	Alan Wright, Johannesburg.

In addition to the foreging, the following East London firms were represented:—
Reunert & Lenz, Ltd., Baldwins (S.A. Ltd., and the Central Electrical Co., Ltd.

LADIES

Mrs. W. C. Aldred, Klerksdorp.
Mrs. W. P. Anderson, Rustenberg.
Mrs. J. W. O. Billingham, Cape Town.
Mrs. C. L. de Beer, Johannesburg.
Mrs. J. J. de Haas, Pretoria.
Mrs. J. E. de Jong, Robertson.
Mrs. J. C. Downey, Springs.
Mrs. C. H. Dwyer, Stanger.
Mrs. H. A. Eastman, Cape Town.
Mrs. G. S. Fainsinger, Mossel Bay.
Mrs. A. N. Field, Worcester.
Mrs. K. M. Fisher, Bethlehem.
Mrs. A. Foden, East London.
Mrs. C. B. Foley, Vereeniging.
Mrs. J. C. Fraser, Johannesburg.
Mrs. P. A. Giles, East London.
Mrs. P. C. Grandin, Vryburg.
Mrs. R. J. Green, Johannesburg.
Mrs. C. E. Gregor, Alberton.
Mrs. A. Hadfield, Gwelo.
Mrs. H. D. T. Harris, Johannesburg.
Mrs. R. W. Hayman, Johannesburg.
Mrs. H. Holtzhausen, Potchefstroom.
Mrs. R. G. Hunter, Johannesburg.
Mrs. J. I. Inglis, Pietersburg.
Mrs. J. Iverach, Grahamstown.
Mrs. W. B. Jackson, Krugersdorp.
Mrs. Morton Jaffray, Salisbury.
Mrs. K. M. Johnston, Johannesburg.
Mrs. T. Kramer, Potchefstroom.
Mrs. G. W. Liddell, Bulawayo.
Mrs. W. Mortimer Mail, Kokstad.
Mrs. P. A. Meintjes, Rustenburg.
Mrs. G. J. Muller, Bloemfontein.
Mrs. I. J. Nicholas, Umtata.
Mrs. H. Quick, Ladysmith (Natal)
Mrs. D. W. Ritson, Stellenbosch.
Mrs. J. H. Rogers, Fort Beaufort.
Mrs. W. Rossler, Kroonstad.
Mrs. J. Schoeman, Alberton.
Mrs. A. R. Sibson, Bulawayo.
Mrs. J. Stoffberg, Randfontein.
Mrs. W. Theron, Worcester.
Mrs. S. J. Thomas, Brakpan.
Mrs. C. G. Thompson, Johannesburg.
Mrs. J. L. van der Walt, Krugersdorp.

LIST OF MEMBERS AS AT 31st MAY, 1948

HONORARY MEMBERS

Van der Bijl (Doctor) J. H., Electricity Supply Commission.
Horrell, L. L., Pretoria.
Poole, E., Durban.
Rodwell, A. T., Johannesburg.

COUNCIL MEMBERS

Adelaide, C.P., Municipality.
Alice, C.P., Municipality, P.O. Box 23.
Aliwal North, C.P., Municipality, P.O. Box 46.
Alberton, Tvl., Municipality.

Barberton, Tvl., Municipality.
Beaufort West, C.P., Municipality.
Benoni, Tvl., Municipality, P.O. Box 45.
Bethlehem, O.F.S., Municipality, P.O. Box 130.
Bloemfontein, O.F.S., City Council, P.O. Box 288.
Boksburg, Tvl., Town Council, P.O. Box 215.
Brandfort, O.F.S., Municipality, P.O. Box 13.
Bulawayo, S.R., City Council, P.O. Box 591.
Butterworth, Transkei, Municipality, P.O. Box 36.
Brakpan, Tvl., Town Council, P.O. Box 15.
Brits, Tvl., Town Council, P.O. Box 106.

Cape Town, C.P., City Council, P.O. Box 82.
Cradock, C.P., Municipality, P.O. Box 24.

Delmas, Tvl., Municipality, P.O. Box 6.
Durban, Natal, City Council, P.O. Box 147.

East London, C.P., City Council, P.O. Box 134.
Elliot, C.P., Municipality, P.O. Box 21.
Ermelo, Tvl., Municipality, P.O. Box 48.
Eshowe, Zululand, Town Board, P.O. Box 37.
Edenvale, Tvl., Town Council, P.O. Box 25.

Fort Beaufort, C.P., Municipality, P.O. Box 36.
Fort Victoria, S.R., Municipality, P.O. Box 17.

Gatooma, S.R., Municipality.
George, C.P., Municipality.
Grahamstown, C.P., City Council, P.O. Box 176.
Greytown, Natal, Borough, P.O. Box 71.
Gwelo, S.R., Municipality, P.O. Box 278.
Graaff-Reinet, C.P., Municipality, P.O. Box 71.

Hercules, Tvl., Municipality, Edward Street.
Harrismith, O.F.S., Municipality, P.O. Box 43.

Johannesburg, Tvl., City Council, P.O. Box 1049.

Kimberley, C.P., City Council.
Klerksdorp, Tvl., Municipality, P.O. Box 160.
Kokstad, E.G., Municipality, P.O. Box 8.
Kroonstad, O.F.S., Municipality, P.O. Box 302.
Krugersdorp, Tvl., Municipality, P.O. Box 94.
Kuruman, Bech'd., Municipality, P.O. Box 4.

Ladysmith, Natal, Borough, P.O. Box 29.
Louis Trichardt, Tvl., Municipality, P.O. Box 96.
Livingstone, N.R., Municipality, P.O. Box 29.

Mafeking, Bech'd., Municipality, P.O. Box 42.
Matatiele, E.G., Municipality, P.O. Box 35.
Middelburg, C.P., Municipality, P.O. Box 55.
Middelburg, Tvl., Municipality, P.O. Box 14.

Nelspruit, Tvl., Municipality, P.O. Box 45.
Newcastle, Natal, Borough, P.O. Box 21.
N'Dola, N.R., Municipality, P.O. Box 197.
Nigel, Tvl., Municipality, P.O. Box 23.

Oudtshoorn, C.P., Municipality, P.O. Box 132.

Paarl, C.P., Municipality, P.O. Box 12.
Pietersburg, Tvl., Municipality, P.O. Box 111.
Pietermaritzburg, Natal, City Council, P.O. Box 321.
Piet Retief, Tvl., Municipality.
Port Alfred, C.P., Municipality.
Port Elizabeth, C.P., City Council, P.O. Box 116.
Port Shepstone, Natal, Borough, P.O. Box 5.
Potchefstroom, Tvl., Municipality, P.O. Box 113.
Potgietersrust, Tvl., Municipality, P.O. Box 34.
Pretoria, Tvl., City Council, P.O. Box 440.

Queenstown, C.P., Municipality, P.O. Box 11.
Que Que, S.R., Municipality, P.O. Box 15.

Randfontein, Tvl., Municipality, P.O. Box 139.
Robertson, C.P., Municipality, P.O. Box 52.
Roodepoort-Maraisburg, Tvl., Municipality, P.O. Box 217, Roodepoort.
Rustenburg, Tvl., Municipality, P.O. Box 16.

COUNCIL MEMBERS—(Continued)

Salisbury, S.R., City Council, P.O. Box 990.
Somerset East, C.P., Municipality, P.O. Box 21.
Springs, Tvl., Municipality, P.O. Box 45.
Springfontein, O.F.S., Municipality, P.O. Box 10.
Stanger, Natal, Town Board, P.O. Box 72.
Stellenbosch, C.P., Municipality.
Somerset West, C.P., Municipality, P.O. Box 19.

Uitenhage, C.P., Municipality, P.O. Box 45.
Umtata, Transkei, Municipality, P.O. Box 57.
Umtali, S.R., Municipality, P.O. Box 121.
Upington, C.P., Municipality, P.O. Box 17.

Vereeniging, Tvl., Municipality, P.O. Box 35.
Vrede, O.F.S., Municipality, P.O. Box 155.
Vryburg, Bech'd., Municipality.
Vryheid, Natal, Borough, P.O. Box 57.

Walmer, C.P., Municipality, P.O. Box 428, Port Elizabeth.
Winburg, O.F.S., Municipality.
Windhoek, S.W.A., Municipality, P.O. Box 59.
Willowmore, C.P., Municipality, P.O. Box 15.
Worcester, C.P., Municipality, P.O. Box 37.

Zastron, O.F.S., Municipality, P.O. Box 20.

ENGINEER MEMBERS

Aalbers, G., Resident Engineer, P.O. Box 52, Robertson, C.P.
Adams, C. H., Municipal Electrical Engineer, P.O. Box 132, Oudtshoorn, C.P.
Anderson, F., Municipal Electrical Engineer, Port Alfred, C.P.
Ashley, T. P., Municipal Electrical Engineer, P.O. Box 11, Queenstown, C.P.
Barton, R. W., Town Electrical Engineer, P.O. Box 25, Edenvale, Tvl.
Barrett, V. E. O., Municipal Electrical Engineer, P.O. Box 71, Graaff-Reinet, C.P.
Barlow, K. B., Town Electrical Engineer, P.O. Box 20, Livingstone, N.R.
Bevington, H. R., Municipal Elec. and Waterworks Eng., P.O. Box 55, Middelburg, C.P.
Bickley, H., Town Engineer, P.O. Box 23, Nigel, Transvaal.
Bradley, D. A., City Electrical Engineer, P.O. Box 369, Port Elizabeth, C.P.
Burton, C. R., City Electrical Engineer, Kimberley.
Burger, J. F., Municipal Electrical Engineer, P.O. Box 10, Springfontein, O.F.S.
Buckerfield, E. N., Municipal Electrical Engineer, P.O. Box 19, Somerset West, C.P.
Cherry, J. R., Borough Electrical Engineer, P.O. Box 139, Randfontein, Tvl.
Cowley, B. W., Borough Electrical Engineer, P.O. Box 21, Newcastle, Natal.
Craig, J. S., Borough Electrical Engineer, P.O. Box 71, Greytown, Natal.
Delport, G. C., Municipal Electrical Engineer, P.O. Box 6, Delmas, Tvl.
de Wet, D. P., Municipal Electrical Engineer, P.O. Box 15, Williwmore, C.P.
de Wit, T., Engineer-in-Charge, Municipality of Brits, P.O. Box 106, Brits, Tvl.
Downey, J. C., Town Electrical Engineer (Actg.) P.O. Box 45, Springs, Tvl.
Downie, C. G., Deputy City Electrical Engineer, P.O. Box 82, Cape Town, C.P.
Dreyer, D. v. s., Town Electrical Engineer, P.O. Box 13, Brandfort, O.F.S.
Dwyer, C. H., Electrical Engineer, Town Board, Stanger, Natal.
Eastman, H. A., City Electrical Engineer, P.O. Box 82, Cape Town, C.P.
Fainsinger, G. S., Municipal Electrical Engineer, Power Station, Mossel Bay, C.P.
Ferreira, N., Electrical Engineer, Odendaalsrus, O.F.S.
Fisher, K. M., Municipal Electrical Engineer, Bethlehem, O.F.S.
Foden, A., City Electrical Engineer, P.O. Box 529, East London, C.P.
Foley, C. B., Municipal Electrical Engineer, P.O. Box 35, Vereeniging, Tvl.

ENGINEER MEMBERS—(Continued)

Ford, A. M., Town Engineer, Winburg, O.F.S.
Fraser, J. C., General Manager, Electricity Department, P.O. Box 669, Jo'burg, Tvl.
Gericke, J. M., Municipal Electrical Engineer, P.O. Box 99, Klerksdorp.
Giles, P. A., Assistant City Electrical Engineer, P.O. Box 529, East London, C.P.
Grandin, P. C., Town and Electrical Engineer, Vryburg Municipality, Bechuanaland.
Gregor, C. E., Town Engineer, Municipality of Alberton, P.O. Box 4, Alberton, Tvl.
Gripper, H. J., Assistant City Electrical Engineer, P.O. Box 369, Port Elizabeth, C.P.
Groom, H. L., Town Engineer, Municipality of Roodepoort-Maraisburg, P.O. Box 217, Roodepoort.
Hadfield, A. W. K., Town and Electrical Engineer, P.O. Box 278, Gwelo, S.R.
Halle, C. R., City Electrical Engineer, P.O. Box 399, Pietermaritzburg, Natal.
Hugo, D. J., City Electrical Engineer, P.O. Box 423, Pretoria, Tvl.
Inglis, J. I., Town Electrical and Water Engineer, P.O. Box 111, Pietersburg, Tvl.
Iverach, J., City Electrical Engineer, P.O. Box 176, Grahamstown C.P.,
Jones, G. E. H., Municipal Electrical Engineer, P.O. Box 42, Mafeking, Bechd.
Kane, R. W., Assistant General Manager, Electricity Department, P.O. Box 699, Jo'burg.
Kinsman, C., City Electrical Engineer, P. O. Box 147, Durban, Natal.
Kramer, T., Municipal Electrical Engineer, P.O. Box 113, Potchefstroom, Tvl.
Leishman, R., Chief Engineering Assistant, Electricity Department, P.O. Box 699, Jo'burg.
Lombard, C., Assistant City Electrical Engineer, P.O. Box 288, Bloemfontein.
Lotter, G. A., Town Engineer, P.O .Box 48, Ermelo, Tvl.
Lyall, R. R., Municipal Electrical Engineer, P.O. Box 45, Nelspruit, Tvl.
Mathews, J. A., Municipal Electrical Engineer, P.O. Box 45, Uitenhage, C.P.
McDonald, F. G., Assistant City Electrical Engineer, P.O. Box 399, Pietermaritzburg, Natal.
McIntyre, H. A., Municipal Electrical Engineer, P.O. Box 14, Middelburg, Tvl.
Meintjes, P. A., Municipal Electrical Engineer, P.O. Box 16, Rustenburg, Tvl.
Mitchell, J. E., City Electrical Engineer, P.O. Box 73, Salisbury, S.R.
Milln, D. R., Town Engineer, P.O. Box 67, Rustenburg, Tvl.
Mocke, T. M., Town and Electrical Engineer, Piet Retief, Tvl.
Mole, E. W., Municipal Electrical Engineer, Walmer, P.O. Box 428, Port Elizabeth, C.P.
Mossop, G. E., Town and Electrical Engineer, P.O. Box 155, Vrede, O.F.S.
Muller, G. J., City Electrical Engineer, P.O. Box 288, Bloemfontein, O.F.S.
Muller, H. M. S., Town Engineer, Upington, C.P.
Newcombe, P. H., Municipal Electrical Engineer, George, C.P.
Nicholas, I. J., Municipal Electrical Engineer, P.O. Box 57, Umtata, Transkei.
Prevost, H. A., Municipal Electrical Engineer, P.O. Box 21, Somerset East, C.P.
Redman, R. H., Assistant City Electrical Engineer, P.O. Box 591, Bulawayo.
Relihan, H. J., Municipal Electrical Engineer, P.O. Box 12, Paarl, C.P.
Ritson, D. W., Municipal Electrical Engineer, Stellenbosch, C.P.
Roberts, L. J., Municipal Electrical Engineer, Power Station, Matatiele, E.G.
Rogers, J., Municipal Electrical Engineer, Fort Beaufort, C.P.
Roode, L., Town and Electrical Engineer, P.O. Box 34, Potgietersrust, Tvl.

ENGINEER MEMBERS—(Continued)

Rossler, A., Municipal Electrical Engineer, Cradock, C.P.
Rossler, W., Town Electrical Engineer, P.O. Box 302, Kroonstad, O.F.S.
Rush, W., Borough Engineer, Corporation of Vryheid, Natal.
Sibson, A. R., City Electrical Engineer, P.O. Box 591, Bulawayo, S.R.
Sims, C. N., Municipal Electrical Engineer, P.O. Box 3, The Strand, C.P.
Smith, E. L., Municipal Electrical Engineer, Boksburg, Tvl.
Smith, M. M., Municipal Electrical Engineer, Adelaide, C.P.
Stevens, F., Borough Electrical Engineer, P.O. Box 29, Ladysmith, Natal.
Tarran, R., Municipal Electrical Engineer, P.O. Box 45, Benoni, Tvl.
Thackwray, W. G., Town Electrical Engineer, P.O. Box 8, Kokstad, E.G.
Theron, W. C., Municipal Electrical Engineer, P.O. Box 37, Worcester, C.P.
Turner, H. T., Town and Electrical Engineer, P.O. Box 121, Umtali, S.R.
Vergottini, P. L., Municipal Electrical Engineer, P.O. Box 15, Brakpan, Tvl.
White, J. H., Municipal Electrical Engineer, P.O. Box 197, N'Dola, N.R.
Williams, V. E. Town Electrical Engineer, P.O. Box 59, Windhoek, S.W.A.
Williams, J. T., Town Electrical Engineer, P.O. Box 43, Harrismith, O.F.S.
Wilson, J. Assistant City Electrical Engineer, P.O. Box 423, Pretoria, Tvl.
Woolridge, W. E. L., Town Electrical Engineer, P.O. Box 24, Harding, Natal.
Wylie, R. J. S., Town Engineer, P.O. Box 96, Louis Trichardt, Tvl.

HONORARY MEMBERS AND ASSOCIATES AS AT 31st MAY, 1948

Andrew, W. M., c/o Electricity Supply Commission, P.O. Box 116, King William's Town, C.P.

Behrens, E. A., 229 Vance Road, Durban.

Baskerville, C. H. V., P.O. Box 1094, Salisbury, S.R.

Baskerville, J. J. Town Engineer, P.O. Box 25, Edenvale, Tvl.

Castle, F., "Te Aroha," Karatara Avenue, Kenilworth, C.T.

Campbell, A. R., P.O. Box 584, Jo'burg.

Clinton, J. S., P.O. Box 4648, Jo'burg.

Coulthard, R. D., 5 Lyonsdown House, 23 Lyonsdown Road, New Barnet, Herts, England.

Conradie, D. J. R., P.O. Box 18, Ficksburg, O.F.S.

Dawson, C., Electricity Supply Commission, P.O. Box 2408, Durban.

Dobson, Dr. J. H., P.O. Box 7764, Jo'burg.

Ewer, Col. G. G., 9th Floor, Surrey House, Rissik Street, Johannesburg.

Gyles, J. H., P.O. Gillettes, Natal.

Harvey, A. Q., Klipfontein Organic Products, P.O. Northrand, Transvaal.

Heasman, G. G., P.O. Box 77, Fort Vic.

Houreld, W., 4 Monument Street, Krugersdorp.

Horrell, L. L., 139 Brook Street, Brooklyn, Pretoria.

Lloyd, R. K., P.O. Box 786, Bulawayo, S.R.

Mail, W. Mortimer, P.O. Box 164, Kokstad, E.G.

Marchand, B., P.O. Box 223, Witbank, Tvl.

Mercier, G., P.O. Box 377, Salisbury, S.R.

Milton, W. H., P.O. Box 1091, Jo'burg.

Poole, E., "Illingworth," Springfield Road, Durban.

Pentz, J. O., P.O. Box 4560, Jo'burg.

Proctor, Major L. B., Electricity Supply Commission, P.O. Box 63, Newcastle, Natal.

Powell, W. N., P.O. Box 1386, Jo'burg.

Phillips, J. W., P.O. Box 592, Bulawayo, S.R.

Rodwell, A. T., "Miranda," Oxford Road, Parktown, Johannesburg.

Stewart, G. A., P.O. Box 6672, Jo'burg.

Solomon, R. Q., Boksburg-Benoni Hospital, Boksburg, Tvl.

Theron, G. C., P.O. Box 1, Van der Byl Park, Tvl.

Tubb, B. H. T., P.O. Box 1699, Salisbury, S.R.

van der Bijl, Dr. J. H., Electricity Supply Commission, Escom House, Jo'burg.

West, J. A., "Edgerton," P.O. Box 24, St. Michael's, South Coast, Natal.

Wright, G. R. E., P.O. Box 465, Benoni, Tvl.

AGENDA AND PROGRAMME

Twenty - Second Convention held in the Wool Exchange, East London,

From 11th to 14th May, 1948

AGENDA

1. Annual Report of Secretary and Treasurer.
2. Election of President.
3. Retiring President's Valedictory Address.
4. Presidential Address.
5. Venue of next Convention.
6. Election of Officers:—
   (a) Vice-President.
   (b) Executive Council.
   (c) Sub-Committees.
7. Reports of Sub-Committees:—
   (i) World Power Conference.
   (ii) Electrical Wiremen's Registration Board.
   (iii) Registration of Electrical Wiring Contractors.
   (iv) S.A. Bureau of Standards—Safety Codes and other Committees.
   (v) S.A. Bureau of Standards—Meter Testing Code.
   (vi) S.A. Standards Institution.
   (vii) Overhead Lines and Code of Practice.
   (viii) Statistical Tables.
   (ix) Coal Commission.
8. Salary Scales.
9. Protection of Electrical Engineers.
10. Auditors—Appointment of.
11. Amendments to Rules and Constitution.
12. General.

RETIRING OFFICERS

President: C. KINSMAN, Durban.

Vice-President: A. FODEN, East London.

Past-Presidents: I. J. NICHOLAS, Umtata; G. J. MULLER, Bloemfontein.

Councillor Members: One representative each of East London and Durban.

Alternates: One representative each of Johannesburg and Pretoria.

Engineer Members: J. C. FRASER, Johannesburg; D. J. HUGO, Pretoria; J. C. DOWNEY, Springs; H. A. EASTMAN, Cape Town.

MEMBERS OF COMMITTEES

1. S.A. Standards Institution: J. C. DOWNEY.. Alternate: D. J. HUGO.

2. S.A. Bureau of Standards and other Committees: J. C. DOWNEY. Alternate: D. J. HUGO.

3. Meter Testing Code: J. C. DOWNEY. Alternate: D. J. HUGO.

4. Electrical Wiremen's Registration Board: J. C. FRASER.

5. Safety Precautions: J. C. DOWNEY. Alternate: J. C. FRASER.

6. Overhead Lines Regulations: J. C. FRASER. Alternate: G. J. MULLER.

7. World Power Conference (Local Committee): H. A. EASTMAN.

PROGRAMME

MONDAY, May 10th, 1948

9.00 a.m. Meeting of Council in Council Chamber, City Hall.

TUESDAY, May 11th, 1948

9.00 a.m. Registration, Issue of Papers, etc.

10.00 a.m. Official Opening of Convention by his Worship the Mayor of East London (Councillor D. Lazarus, J.P.).

10.30 a.m. Refreshments.

11.00 a.m. Annual General Meeting (Visitors may attend, but only members may vote).

12.30 p.m. Mayoral Luncheon, Deal's Hotel.

2.30 p.m. Official Photograph.

8.00 p.m. Cinema Show, "Colosseum" Theatre, as guests of City Council.

WEDNESDAY, MAY 12th, 1948

8.30 a.m. Meeting of Council.

9.30 a.m. Convention resumes.

10.30 a.m. Refreshments.

11.00 a.m. Paper by Mr. W. M. Andrew, King William's Town, on "Some Observations and Notes on Supply to Rural Areas."

12.30 p.m. Luncheon Interval.

2.30 p.m. Circle Drive "Prince George Drive" and refreshments at Leach's Bay Tea Room. Buses leave Orient Bath Stop, stopping at the Market Square for five minutes. Trip will be completed by 5 p.m.

8.30 p.m. to 9.30 p.m. Concert arranged by Mr. Lionel Field, Musical Director, City of East London, at Orient Beach Tea Room. Refreshments will be served at the conclusion of the entertainment.

THURSDAY, MAY 13th, 1948

8.30 a.m. Meeting of Council.

9.30 a.m. Convention resumes.

10.30 a.m. Refreshments.

11.00 a.m. Paper by Mr. P. A. Giles, East London, on "Some Economic Factors in the Purchase and Use of Electrical Plant with Special Reference to the High Price of Materials."

12.30 p.m. Luncheon Interval.

2.30 p.m. Convention resumes.

3.30 p.m. Refreshments.

4.00 p.m. Convention resumes.

5.00 p.m. Convention adjourns.

FRIDAY, MAY 14th, 1948

8.30 a.m. Meeting of Council.

9.30 a.m. Convention resumes.

10.30 a.m. Refreshments.

11.00 a.m. Convention resumes.

1.00 p.m. Convention closes if business completed.

LADIES PROGRAMME

Tuesday, May 11th, 1948

10.00 a.m. Official Opening of Convention.

10.30 a.m. Refreshments.

8.00 p.m. Cinema Show, "Colosseum" Theatre.

Wednesday, May 12th, 1948

2.30 p.m. Circle Drive "Prince George Drive" and refreshments at Leach's Bay Tea Room.

8.30 p.m. to 9.30 p.m. Concert at Orient Beach Tea Room.

Friday, May 14th, 1948

1.00 p.m. Convention Closes.

THE ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS OF OF SOUTHERN AFRICA

Proceedings of the Twenty-Second Convention

The Twenty-Second Convention of the Association of Municipal Electricity Undertakings of Southern Africa was opened in the Wool Exchange, East London, by His Worship the Mayor, Councillor D. Lazarus, J.P., at 1 a.m. on Tuesday, the 11th May, 1948.

Representatives of 55 Municipalities were present at the Convention, including 39 Councillor Members, 56 Engineer Members and Engineers representing Municipalities, 1 Honorary Member, 7 Associates, 18 Delegates from Government Departments, other Supply Authorities and Engineering Institutions, etc., 26 other visitors, 48 Trade Representatives and 46 Ladies—a total of 241.

CIVIC WELCOME

PRESIDENT (Mr. C. Kinsman, Durban):

Ladies and Gentlemen, my first and very pleasant duty is to welcome you all to this our twenty-second Convention, and my second duty, equally pleasant, is to introduce to you His Worship the Mayor of East London, Councillor D. Lazarus, who has been good enough to spare some of his valuable time to come here and declare our proceedings open and I ask you now, Sir, to do us that favour.

HIS WORSHIP THE MAYOR OF EAST LONDON (Councillor D. Lazarus, J.P.):

Mr. President, Ladies and Gentlemen: As many of you may be aware, this year of grace, 1948, is East London's Centenary Year. East London, this year, has certainly enjoyed a reputation for being a City of Conferences—and it is a reputation we are very proud of—we have had Conferences not only of a nature such as this, but Conferences, if I may use that word, which are as important to some as the Conference we are holding now is to you, for we have had a "Conference" to decide the relative merits of eminent golfers and bowlers

It is my great pleasure and privilege today to welcome to East London on behalf of the City Councillors and citizens of East London the delegates to your Conference from many parts of the Union and Rhodesia, and I want to say also that this welcome is being accorded to you in the true East London manner, i.e., in an abundance of heartiness, sincerity and good wishes. Your stay will be a short one but we sincerely hope that during that sojourn of yours, you will be able to enjoy yourselves to the full and be able to partake of the many interesting functions which have been arranged for your benefit, and we shall do everything possible to make your sojourn here a pleasant one, and when you return to your home towns, we hope you will decide, as a result of this visit, that you will soon be here again.

As a layman, I am not in a position to expound on matters electrical, that is your prerogative, and in any case I would not attempt to tap an electric wire, but I want to say that if it were not for electricity, the world would be in a chaotic state today, for in some form or other our daily needs are dependent on electricity. The things which strike a layman are the benefits of electricity.

The motor car demands electrical ignition. Modern railway systems depend upon electricity for propulsion and signalling. Imagine the world without telephones. Aeroplanes demand electrical equipment. In our everyday life, imagine the chaos without an electricity supply.

We commence the day by being awakened by an electric alarm clock, heat the shaving water and dress in our electrically manufactured and laundered

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clothes. After partaking of our electrically cooked breakfast, we go to business by means of an electric car or train.

Should the office be stuffy, we switch on the electric ozone apparatus and fan. Having had a rather hectic day, we have an electric light bath, and become rejuvenated.

In our moments of leisure we are again dependent upon this wonderful agency. Comfortably seated in our electrically manufactured furniture, after an electrically cooked meal we switch on lights, radiator and wireless and listen to the finest orchestra or the news from all parts of the world just by turning a few knobs, and hope that the programme will not be spoiled by electric atmospherics.

Should we desire a change in our relaxation and decide upon a visit to the bioscope, the projection of the picture and speech is only possible by electricity.

Returning home we retire to our comfortable electrically warmed bed and shortly afterwards are disturbed by the electric burglar alarm.

In time, this electric career reduces us to such a condition that we visit a curative establishment for treatment of elecrtic baths, massage, etc.

Reverting to the bioscope, I remember when talking pictures were considered a Wellsian development, but today they are looked upon as a commonplace and the production of such is not given a second thought.

So with our later invention, television. This is still in the infant stage but a very rapidly developing infant as television is an accomplished fact but at present only over a short distance. I suppose the time is not far distant when each of us, instead of our ordinary radio, will have a radio-cum-television set, and all the unfortunate results that might arise.

When we are sick, cures by new compounds made by electrical processes are sought or given and we must dwell for a moment upon the severe handicap which a medical practitioner would suffer had the wonderful invention of the X-ray not been available to him.

To assist us in fighting disease, ventilation and air conditioning invariably depend upon electricity. In the congested industrial areas overseas, grit precipitation by the electrical process prevents the emission from factory chimneys polluting and disfiguring the surrounding district.

In agriculture, nature is being speeded up by electrically heated soil. Electrically heated incubators are supplanting mother hen's moments of leisure and she is now being bluffed into believing that we now obtain 24 hours daylight and as a consequence she becomes a more prolific source of revenue than hitherto.

And so we could go on ad infinitum enumerating the advantages and what has now become the necessity of electrical energy.

Your Convention is going to deal with the various aspects of Municipal Undertakings and you have a very formidable Agenda before you. I do sincerely wish and hope that your deliberations during the next few days will be in every way successful for the benefit, not only of Municipal Undertakings, but of all throughout South Africa. With these few remarks it affords me great pleasure in declaring the Twenty-second Convention of the Association of Municipal Electricity Undertakings open. May I express the hope once again, Mr. President, that you and your delegates will have an enjoyable time in East London and that your next Convention will also take place at East London.

PRESIDENT (Mr. Kinsman):

Mr. Mayor, Ladies and Gentlemen, on your behalf I wish to express to His Worship the Mayor, our thanks for having spared his time to come here—and Mayors do have busy times as those of you who are Councillors will realise—for having given us a very cordial welcome and for having launched this Convention.

We also wish to thank your City Council, Sir, through you, for their invitation to hold this Convention in their City. When your representative in Durban, a year ago, extended your invitation to hold this Convention here, his laudation of

East London caused me, as President, to suggest that "trade talk" was not permitted in our Conventions, but after what I have seen of East London, I apologise to that gentleman, because I feel that if anything he was rather modest in his claims.

We, in Durban, think we are growing up very nicely and we say we are getting more and more like London each day, but having been here and seen your street lighting and one or two other features, I think we might say in our outbursts of pride in the future that we are getting more like East London every day!

I congratulate you on having attained your Centenary and we share your pride in your development and in the growth of coastal ports among which East London takes no mean place. We do congratulate you on your growth and we look forward with great interest to your future development.

These Conventions have their moments of strenuous labour—some people may not believe that, but I can assure you they do; there are labours which we put in, and which can only be put in, in the joint assembly of the representatives of all the undertakings in South Africa—but those labours will be considerably lightened by the amenities of this City and the hospitality that your City Council is extending to us in giving us an opportunity of enjoying those amenities. You have launched this Convention in very happy terms.

I understand the profession you adorn is that of Accountancy and I think that, with your comprehensive appreciation of the part electricity plays in modern life and your vision for the future, the electrical profession has lost a very able member, although we congratulate the Accountancy profession on having an Accountant with such a wide and deep appreciation of electricity.

With those words, Sir, I will again congratulate you on attaining your Centenary and thank you for your hospitality, and I assure you that we will all leave East London with very deep thanks and appreciation for the kindness shown us and with very high hopes and wishes for East London's future.

My next duty, ladies and gentlemen, is to call for nominations for the office of President for the ensuing year.

ELECTION OF PRESIDENT

COUNCILLOR MAJOR J. RAFTERY, J.P., M.P.C., Durban:

Mr. President, Ladies and Gentlemen, it gives me much pleasure in nominating the City Electrical Engineer of East London as President for the ensuing year. I have known this gentleman for very many years and I know he is held in esteem by his fellow Engineers and by East London. As representing the City of Durban, it gives me much pleasure in proposing that Mr. Foden be elected. His election would be a well-deserved tribute to himself and to this City. With those few words, I leave it to you Sir.

MR. J. C. FRASER, Johannesburg:

Mr. President, Ladies and Gentlemen, it is my privilege and pleasure to second the motion of Major Raftery. I do so with the knowledge that in nominating Mr. Foden for the office of President we are nominating an Engineer of outstanding ability, an Engineer who has given a great deal of his time to the work of the Association and I can assure members that by nominating Mr. Foden they are putting the affairs of the Association in very good hands.

PRESIDENT:

Any other nominations? There being no further nominations I have much pleasure in declaring Mr. Foden the President of this Association for 1948-1949.

Mr. A. FODEN, East London:

Mr. Mayor, Major Raftery, Ladies and Gentlemen, I sincerely appreciate the honour that you have conferred upon me this morning. The high standards of my predecessors in office have set me an example which I will endeavour to emulate. It will be no mean task. I can

assure you, and this Association is growing year by year and the duties and responsibilities thereby increased, but I can only say I am going to do my best, and that with the assistance of the Executive of this Association, I hope we are going to have a very happy and successful year.

I take this opportunity of thanking you for the honour that has been conferred upon me and the confidence that you have shown in declaring me your President. Thank you.

(At this stage, Mr. C. Kinsman relinquished the Chair in favour of the newly elected President, Mr. A. Foden).

OBITUARY

PRESIDENT (Mr. A. Foden, East London):

Mr. Mayor, Ladies and Gentlemen, since our last meeting I regret that a relative of one of our colleagues has passed over; I refer to the son of Mr. and Mrs. Sibson, and the wife of a greatly respected colleague, Mr. Rodwell, I regret to say, has passed away. Our very old friend, Mr. Smith of the S.A. Cable Makers Association, has passed over, and as a mark of respect, I would ask you to rise.

APOLOGIES

We have to announce apologies and other messages of congratulation for a successful Convention. I will give the ladies precedence. I have a telegram from Mrs. Newcombe, George, reading as follows:—

"Happy pow-wow to the girls and successful Convention."

The following further telegrams have been received:—

H. R. Bevington, Middelburg, Cape Province:

"Congratulations successful Convention. Regret forced absence."

H. J. Gripper, Port Elizabeth:

"Best wishes for successful twenty-second Convention. Charge up well without spilling too much on rates. Build up load for safe distribution and drive home convictions having discharged duties satisfactorily."

E. Poole, Honorary Member, Durban:

"Congratulations on twenty-second Convention. May your deliberations lead to still further spreading of electricity networks throughout South Africa. Regret unable to attend. Regards to all."

Irving Steyn, Springs:

"Terribly sorry could not manage to get away. Best wishes and regards."

Upington Municipality:

"Delegates unable to be present. Best wishes for successful Conference."

It is unfortunate that we have not the pleasure of Mr. Hugo's presence this time, who is a respected member of the Executive Council, but he finds he is unable to attend, so he also tenders his apologies.

I also have an apology from Dr. van der Bijl, the Chairman of the Electricity Supply Commission. We were hoping that Dr. van der Bijl would address our Convention, together with Mr. Harding and Mr. Furness, but unfortunately, their duties in Johannesburg have prevented them from attending and they also send their apologies.

Apologies were also received on behalf of the following:—

Mr. Wright, Benoni.

Mr. Damant, Electricity Supply Commission, Durban.

Mr. Rodwell, Johannesburg.

Col. Mitchell, Posts and Telegraphs.

Major Caprara, Director General, S.A. Broadcasting Corporation.

GREETINGS AND APOLOGIES COMMUNICATED

V. E. Williams, Windhoek (Member).

G. A. Lotter, Ermelo (Member).

B. H. J. Tubb, Salisbury (Member).

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Department of Commerce & Industries, Pretoria.

Engineer-in-Charge, Electricity and Water Undertaking, Lusaka, Northern Rhodesia.

Chief Engineer, The Rhodesian Railways, Ltd.

Chairman, S.A. Standards Institution.

Manager, Cape Town Undertaking, Electricity Supply Commission.

Chairman, Electricity Supply Commission, Salisbury.

Controller of Building Materials (Electrical), Johannesburg.

Chairman, Fuel Research Institute of South Africa.

President, S.A. Council for Scientific and Industrial Research.

His Honour the Administrator of the Cape Province.

Chief Engineer, Rand Water Board.

Mr. F. W. Joubert, ex Chief Inspector of Factories.

PRESIDENT:

Ladies and Gentlemen, I will now call upon Mr. Kinsman to give his Valedictory Address.

RETIRING PRESIDENT'S VALEDICTORY ADDRESS

By C. KINSMAN, M.I.E.E.

City Electrical Engineer, Durban

It has become the custom in our Association for the retiring President to deliver a valedictory address, but custom does not give any guidance in the choice of a subject. Valedictories suggest leave-takings and farewells—fitting occasions for retrospect and reminiscence. Today, however, I shall resist the temptation to indulge in that direction. I propose, instead, to speak on one of the less tangible factors which affect the efficient functioning of our undertakings.

We are only too well aware of the impediment in the way of development created by the difficulty in getting sufficient supplies of materials and plant. I wonder if we recognise and appreciate the possible extent and effect of another factor—intangible but not the less impeditive—which for convenience I shall call "mental approach." I hasten to assure you that I am not competent—nor would I wish — to address you on psychiatry or applied psychology; that is why I have used the simple term "mental approach." By this, I mean the line of thought along which a person, wittingly or unwittingly, tackles his particular task or a particular problem. There is no need for me to stress the value of a proper and positive conditioning of the mind towards a task, if that task is to be discharged satisfactorily; that is generally accepted.

With the present vital need for high production and the many difficulties that beset the path of post-war progress, an analysis of the difficulties and a search for the most effective means of overcoming them is essential. This address is in the nature of an attempt to focus attention upon one particular class of difficulty, by giving several examples, in the hope that those better fitted will give it closer study and suggest means of overcoming

A. FODEN, EAST LONDON
President, 1948-1949

them. If, in my address, I suggest partial correctives, I do so only as an engineer of some little experience who is at the same time but a layman in this particular sphere.

Let us first consider the mental approach to his job by the youngest entrants into our industry—our apprentices —youths brought up in a country where the white race has for long enjoyed a privileged position. While their forebears, in a uniracial country in Europe, may have enthusiastically applauded such theories as the equality of man—or at least the right to an equality of opportunity — these youths, brought up in a multi-racial country, find it difficult to lend the same enthuiastic support to these theories and to envisage the inevitable development of the coloured races. I fear that very few of our youths, feeling secure in their present privileged position, as they do, ever embark on their apprenticeships stimulated by this thought, "If the time ever comes when I must compete for a livelihood with the presently less advanced races of this country, I am determined that I shall succeed by reason of my superior technical ability and skill." I make no excuse for putting this point of view to new apprentices in an attempt to stimulate them to attain a high standard of proficiency at their respective trades.

Another attitude of mind which militates against the full development of some of our youths today is of more recent origin and is represented by the question "Why should I work hard at my studies?—they will be wasted if another war should come—as seems likely." I can assure you that this attitude of mind is a very real one with quite a number of youths today. The obvious counter, of course, is "Why jeopardise your future career because of fear of a war which we hope will not come?—in any case if it does unfortunately come, it will be a struggle for survival in which technical efficiency and equipment will count for much and you will be the better fitted to bear your part if you are fully-trained technically."

I have drawn attention to two examples of unimaginative or faulty mental approaches by youth; others could be cited. Today, as perhaps never before, does the white youth of this country need the most careful and sympathetic guidance if he is to play his proper part in the critical years ahead—years which, in my opinion, are not very far ahead.

Now let us take an example of faulty approach by the adult mind in the rank and file of our industry—I refer to one aspect of the claim for shorter hours. The claim is not unreasonable if its true purpose is to afford leisure that is to be usefully spent in improving the mind or in recreation—in its literal sense of re-creating; these two factors must increase mental and physical vigour and so raise efficiency. Where, however, the real purpose of the claim, as distinct from the avowed purpose, is to decrease output and to enhance the market value of labour, the ultimate effect is insidious and two-fold—it must lead to economic disaster and it also cuts at the root of true citizenship. Fortunately many of the leaders of organised labour appreciate the position and stress the fact that in asking for higher reward and better conditions the workers must in return be prepared to give a fair day's work of a proficient quality.

In this connection, it should be appreciated that any weakness on the directive side of an organisation must have an important bearing upon the output of the rank and file. With the generally high standard of intelligence of electrical workers they are very alert to weaknesses in the directive; if weaknesses exist, the workers can hardly be blamed if they react to them. It is surely asking too much to expect a man to put his best into a job, if on completing it, he is left "kicking his heels" while awaiting his next instructions. Wherever possible he should know before completing one job what his next job will be—such a practice would satisfy the worker that his efforts are being properly utilised and it would probably add interest to his work.

I now come to my final observations on the subject. Which of us is not familar with the phrases "shortage of materials," "shortage of labour," "pressure of work" —they are in danger of becoming stock phrases and of taking their place with such other clichés as "the matter is receiving attention." It is admitted that, in many cases, they truly represent the position. Is there not a danger, however, that their constant repetition may lead to their unquestioning acceptance and to their being used as an excuse to cover something else?

The tempo and condition of our organisations, built up over a number of years, was rudely disturbed in 1939. Then our organisations were disrupted and our staffs depleted—make-shift and improvisation became the order of the day. With the end of the war came the need for rehabilitation, re-conditioning and reorganisation — with new men on our staffs and with men in new positions. Are we satisfied, in the standard of organisation and in work-output, that we are at least back to the 1939 standard, or are we still out of training? Are we satisfied that each member of our respective staffs is adopting a proper and positive approach to his duties, particularly in those duties entailing the direction of other employees, or are his efforts being stultified by too great an emphasis on and acceptance of "pressure of work."

In my personal experience, I have come across more than one instance where "pressure of work" has been given as the reason for delay in carrying out a task. Very cursory examination of the circumstances showed that a slight readjustment of routine would have permitted the work to be done without delay and without prejudicing another job.

The questions I have suggested can be answered, in the case of any undertaking, only by the engineer in charge of that undertaking but they are questions which must be asked and answered. Efficiency, especially in the electricity supply industry, depends not only upon the perfection of its plant and equipment; it depends too upon the interest, skill and loyalty of its workers and upon the technical knowledge, the capacity for initiative and the readiness to accept responsibility of its engineering staff. The development of all these qualities in a person is dependent upon his attitude of mind towards his particular job.

May I conclude this short essay into a new and only partially explored field by quoting these lines by Kipling:—

The careful text-books measure
(Let all who build beware!)
The load, the shock, the pressure
Material can bear.
So, when the buckled girder
Lets down the grinding span,
The blame of loss, or murder,
Is laid upon the man.
Not on the Stuff—the man!

The prudent text-books give it
In tables at the end—
The stress that shears a rivet
Or makes a tie-bar bend—
What traffic wrecks macadam—
What concrete should endure—
But we, poor sons of Adam,
Have no such literature,
To warn us or make sure!

We only of Creation
(Oh, luckier bridge and rail!)
Abide the twin-damnation—
To fail and know we fail.
Yet we—by which sole token
We know we once were Gods—
Take shame in being broken
However great the odds—
The Burden or the Odds.

Mr. President, ladies and gentlemen, I thank you most sincerely for the support and goodwill which has been shown me during my year of Presidency by all of you. I appreciate the honour I have had and I have enjoyed the work—such work as I have been able to do for the Association. I have handed over to Mr. Foden very confident that he will serve us well. I wish him great success and happiness in the President's Chair.

PRESIDENT:

Mr. Kinsman has touched on two subjects very dear to my heart, namely, the training of apprentices and world economics. Without saying anything further, I will call upon Mr. Muller to respond.

MR. G. J. MULLER, Bloemfontein:

Mr. President, Mr. Mayor, Ladies and Gentlemen, it is seldom that we have such an illuminating address as this. It gets to the root of a lot of our troubles. We have, as you say, quite a bit of trouble with materials and the stock phrase of "pressure of work," but I think it is a mental attitude that quite a few of us have towards our duties that is basically to blame. It is, therefore, with pleasure that I listened to your address and I am sure there is quite a lot that each of us can take home and digest at leisure. It is rather a pity that you should attack that stock phrase of ours "pressure of work." You know it is so convenient when it is difficult to find any other answer or when you have forgotten. Most of us fail in that direction sometimes and this explanation was very nice. Now you have debunked it and I won't be able to use it again.

Mr. President, you have a year of office behind you and as it is only recently that I occupied that position, I know from experience just what it means and I feel sure that you are very much relieved that it is behind and not in front of you. We start the Presidentship with great hopes and swollen pride, but before the week is over we feel like a flower in a buttonhole at the end of the day, and with these remarks, Sir, I thank you very much for this address.

PRESIDENT:

Mr. Mayor, Ladies and Gentlemen, before we adjourn for refreshment I would like to express my pleasure in seeing such a formidable gathering here today. It gives me great pleasure to see two very old foundation members of the Association here. Don't take it amiss if I don't name others, but I do particularly welcome Mr. Bellad-Ellis and Mr. Frank Castle. Mr. Castle, as we all know, has not been too well over the last year or two and I think it is a token of appreciation to have him here; it must have been an effort and I do appreciate his presence here this morning, and that of Mr. Bellad-Ellis. We also have pleasure in welcoming Mr. H. O. Smith, and I hope that our associations with Mr. Smith will be as happy as they have been with Mr. Joubert. I am sure they will be. I have great pleasure in welcoming Mr. Milton of the Electricity Supply Commission and Mr. Dalton, representing the S.A. Railways and Harbours, and as previously mentioned, anyone who I have omitted to mention by name.

I shall be pleased now Mr. Mayor, if you would partake of refreshment with us, when we adjourn, and with those few words, ladies and gentlemen, we will adjourn for refreshment.

The Convention adjourned at 10.45 a.m.

The Convention resumed at 11.15 a.m.

PRESIDENT:

Mr. Mayor, Ladies and Gentlemen, whilst giving my Presidential Address, I will ask Mr. Kinsman to conduct the meeting.

MR. KINSMAN (In the Chair):

I now ask Mr. Foden, our new President, to deliver his Presidential Address.

PRESIDENTIAL ADDRESS

PROGRESS AND THE ENGINEER

By

A. FODEN,

M.I.E.E., M.I.Mech.E., M.I.(S.A.)I.E.E.

Gentlemen,

I am deeply appreciative of the high honour you have conferred upon me by electing me President of this Association, and I can only say that I will endeavour, with the able assistance of my colleagues

on the Executive, to do everything possible to advance the already remarkable progress of this Association.

It is extremely gratifying to see year by year the increased interest taken in our deliberations by councillors, which augurs well for the progress of our organisation and, therefore, in turn the progress of Electricity Undertakings throughout this sub-continent.

PROGRESS OF THE A.M.E.U.

For the benefit of new members, and in the event of their not noting the Objects contained in our Constitution, may I say that Objects (a) and (b) are, respectively, "to promote the interests of Municipal Electricity Undertakings" and "to bring Municipal Electrical Engineers and Chairmen and Members of Municipal Electricity Committees together." These two objects alone are, in my opinion, factors which have played a large part in advancing the growth of electricity undertakings and making them the financial successes they are today. Without that harmony between the engineers and councillors it is probable that undesirable conditions could easily prevail, thus retarding progress. This annual "getting together" gives us the opportunity for interchange of ideas, expressions of opinions, discussions on troubles overcome and still prevailing, so that with the Convention behind us we may go forward full of zeal for a further year's progress of our respective undertakings.

As a matter of interest and to show the progress of the Association's activities during its 33 years' existence, records show that 17 persons were present in 1915 at the first Convention in Johannesburg, whereas at Durban last year 53 municipalities were represented by 37 councillor members and 54 engineer members, apart from 20 delegates representing Government Departments, other Electricity Supply Authorities and Engineering Institutions. Altogether a total of 214 persons were present, and in a young and sparsely populated country such as this the progress achieved is something to be proud of.

PROGRESS OF EAST LONDON'S ELECTRICITY UNDERTAKING

This year, 1948, we in East London are celebrating our Centenary year. One hundred years ago the Governor of the Cape, Sir Harry Smith, issued a proclamation annexing East London with the country for two miles around it to the Cape Colony.

In 1848 electricity was non-existent in East London as in the case of many other towns in the world, but in October, 1899, an electric lighting system was formally commissioned by the Mayor of that day, Councillor W. C. Jackson. At the end of the year 1900, 182 consumers were connected to the supply mains, and the revenue for the year 1900-1 was £4,345.

With the advent of electricity, an electric tramways system was introduced and the first trams commenced running in January, 1900, and continued in operation until November, 1935. I think East London can therefore be justifiably proud of introducing both electric lighting and electric transport in those far off days.

For the purpose of comparison and to show the progress of electricity supply in this City, the number of consumers connected at the end of 1946 was 8,889 and the revenue was £211,879.

During the year 1946 negotiations had proceeded between the East London City Council and the Electricity Supply Commission, and in February, 1947, the Administrator approved the agreement between the aforementioned bodies for the Commission to take over the generation and supply of electricity for East London. The City Council, therefore, now purchases current in bulk from the Commission and retains the reticulation system for electricity supply within the Municipal boundaries.

The demand for electricity is rapidly increasing owing to its cheapness, and the increased population brought about by the incorporation of surrounding areas within the Municipal boundaries, and the industrial development of this City. So

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much so that a further 7,500 kw. Turbo-Alternator and two 45,000 lbs. per hour boilers are now on order. With the installation of this plant the capacity of the Electricity Supply Commission's Power Station at East London will be 32,000 kw. In addition to this the Electricity Supply Commission is now engaged on the design of a new Power Station for this area with an ultimate capacity of 100,000 kw.

I am sure all present will forgive me for having dealt with the growth of East London's Electricity Undertaking in particular, but I feel that at a gathering such as this it is desirable, if not essential, to indicate to everyone present that East London has emerged from the background to the forefront as an industrial centre.

The demand for electricity is a reliable barometer showing as it does whether or not industrial development is going up to "Fair" or going down to "Stormy," and from the foregoing facts and figures East London's industrial barometer is set "Fair." This being so I am of opinion, and which opinion is shared by many others, that East London has now set its course for a voyage to industrial prosperity, and, further, that this voyage can be faced with equanimity.

WORLD PROGRESS

Under the two previous sub-headings I have touched upon the progress of our Association and that of East London and its Electricity Undertaking. It is very clear, I am sure, to everyone that the Electrical Engineer has played no small part in the progress of the organisations I have mentioned. Let me say at once that this progress is not due to the Electrical Engineer only, as in the efficient operation of an industry or organisation many experts are requisite, such as financial, commercial, technical and skilled operatives. Each individual is a cog in the wheels which form our present-day intricate economic structure, and it is essential to our progress that the meshing of these wheels is as near perfection as it is humanly possible to accomplish.

This analogy to the machine brings in its train the Engineer, and associated with the Engineer there springs to the mind the subject of planning. A few weeks ago I listened with interest to a visitor to East London, who, in the course of an address, stated that in his opinion we in South Africa are doing too much planning and not enough implementation. We Engineers and Councillors know the necessity for planning, but in my opinion also there can be far too much planning. When a scheme is under review very often subjects relevant and otherwise are brought up and rightly criticised, which criticism is all to the good if it is of a constructive nature; but if it is solely destructive and brought about with the object of side tracking the scheme, then so much time has been wasted.

The world today is in a sorry plight in spite of the wonderful achievements of man. Civilisation as we know it is a phase of human advancement by which we reach a certain stage of social, moral, intellectual and industrial development.

Engineers and scientists have succeeded in practically annihilating time and distance. By what methods were these objects achieved? We as engineers proceed to a problem by logical and scientific approach by reason of our training, and have learned the value of co-operation and collective organisation. We have endeavoured to apply the results of our research and consequent inventions to the betterment of mankind and it cannot be disputed that the achievements of the engineer and scientist have provided mankind with those amenities which enable it to live a fuller life than that of our forefathers.

The results of the research of engineers and scientists are never intended for destruction but for construction. Unfortunately these results to which I refer are in time of war used by nations for destruction, with the result that the sufferings brought about are in great measure laid at the door of that small proportion of mankind who have invented the principles by which the instruments of death, used in modern warfare, are

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Under the two previous sub-headings I have touched upon the progress of our Association and that of East London and its Electricity Undertaking. It is very clear, I am sure, to everyone that the Electrical Engineer has played no small part in the progress of the organisations I have mentioned. Let me say at once that this progress is not due to the Electrical Engineer only, as in the efficient operation of an industry or organisation many experts are requisite, such as financial, commercial, technical and skilled operatives. Each individual is a cog in the wheels which form our present-day intricate economic structure, and it is essential to our progress that the meshing of these wheels is as near perfection as it is humanly possible to accomplish.

This analogy to the machine brings in its train the Engineer, and associated with the Engineer there springs to the mind the subject of planning. A few weeks ago I listened with interest to a visitor to East London, who, in the course of an address, stated that in his opinion we in South Africa are doing too much planning and not enough implementation. We Engineers and Councillors know the necessity for planning, but in my opinion also there can be far too much planning. When a scheme is under review very often subjects relevant and otherwise are brought up and rightly criticised, which criticism is all to the good if it is of a constructive nature; but if it is solely destructive and brought about with the object of side tracking the scheme, then so much time has been wasted.

The world today is in a sorry plight in spite of the wonderful achievements of man. Civilisation as we know it is a phase of human advancement by which we reach a certain stage of social, moral, intellectual and industrial development.

Engineers and scientists have succeeded in practically annihilating time and distance. By what methods were these objects achieved? We as engineers proceed to a problem by logical and scientific approach by reason of our training, and have learned the value of co-operation and collective organisation. We have endeavoured to apply the results of our research and consequent inventions to the betterment of mankind and it cannot be disputed that the achievements of the engineer and scientist have provided mankind with those amenities which enable it to live a fuller life than that of our forefathers.

The results of the research of engineers and scientists are never intended for destruction but for construction. Unfortunately these results to which I refer are in time of war used by nations for destruction, with the result that the sufferings brought about are in great measure laid at the door of that small proportion of mankind who have invented the principles by which the instruments of death, used in modern warfare, are

manufactured. Has mankind then reached an impassé from which, due to present day civilisation, there is no bright future to look forward to?

It is true that the peoples of the world generally are living in an era of perplexity and frustration, but I would say that we have by no means reached an impassé. It is equally true that there is no question of turning back, as science has given us so much that without those scientific amenities we are all so accustomed to today, modern life and civilisation would come to a standstill within a few hours.

What then is the answer or remedy to the ills of the world today, this elimination of the sense of perplexity and frustration? I venture to say that the whole future must be based on truth and by this I mean a scientific outlook, an outlook based on logical thought and scientific approach. Today for every scientist there are thousands of people with no scientific training or outlook and it is they who invariably and ultimately control the results of research and applications of science, and put such knowledge to evil use.

Our greatest hope for the future is to develop logical thinking, the scientific outlook, for when this is achieved men will think wisely and act in a similar manner. One may say in what way or how is the engineer involved in this effort to bring about progress in the world today? It cannot be gainsaid that it was the engineer and scientist that saved the world in the dark days of World War II. Apart from the technical aspects of radar, "degaussing" of ships, jet propulsion, and finally the harnessing of atomic energy, it was the engineer who tapped and utilised the vast field of unskilled labour, training it by sectionalising complicated operations to produce the munitions of war that brought victory to the cause of the Allied Nations.

If we engineers can accomplish all these things in war time, and this accomplishment was brought about by scientific approach and logical reasoning, is it not pertinent to ask why our services, or at least our methods, cannot be utilised to bring about some semblance of stability in a war weary world, a world which, I am sure, is only too anxious to practice the arts of peace?

We must realise today, as citizens of the world, that our duty to the world is beyond engineering education, research and manufacture, and that we must play a more prominent part in the social and economic affairs of the community in so far as our education and training will allow. The type of training requisite to solve a difficult social or economic problem does not differ from that necessary to solve a technical or scientific problem.

I have referred earlier to the definition of civilisation and the achievements of engineers and scientists, and returning to these subjects would say that man has still to achieve his greatest triumph, that is, the abolition of war. Associated with man is man-power, and this could be defined as a combination of mental and physical forces, and included in the mental force should be the spiritual or religious force.

We have mastered the art of manufacturing things, we increase our speed, powers of vision and audition, but we have not, as shown by wars, achieved the art of living together peacefully, and it is with this art that religion is concerned. Undoubtedly this task of living together peacefully is more difficult than the task of understanding the material things of the world. We overcome sooner or later the difficulties encountered in the material world and I confess that finding the solution to overcome the difficulty of peacefully living together is not perhaps so easy, but undoubtedly the approach to, or the methods to be applied, are the same, namely, logical, experimental, disinterestedness and patience.

Warfare is no doubt aggravated by the problems of language, nationality, geography and education. Under the wise and increasing endeavours of the leadership of the civilised nations a new era of peace could be achieved if the peoples of the world could be educated to insist upon differences being settled by reason and

understanding and not by force of arms.

We, as citizens of the world, are here to give to our fellow men the benefit of our knowledge and experience in order that human life, its health and welfare may in turn benefit. As engineers we are inclined to remain aloof from social and economic spheres, but I am convinced that if we could only inculcate our methods of scientific approach into the minds of political leaders and others who influence the minds of the majority of the people of the world then we would see the dawning of a peaceful era.

The subject I have chosen for my address does not fall under the usual heading, but I am sure you will agree with me that exceptional conditions call for exceptional treatment. We are living under exceptional conditions and the reason I chose the subject "Progress and the Engineer" for my address was that I wished to emphasise that engineers are responsible citizens and that they desire to work for the benefit of mankind generally.

Let us not be satisfied to apply ourselves solely to projects involving electrical and mechanical engineering and show no concern of the results, but to take a greater interest in the welfare of the community. Should any of these results react against the best interests of the community, then we should apply ourselves to the work of readjustment and thereby play our part in directing the full resources of the community to the best advantage. By doing this, a better and fuller realisation of all that man or man-power means will enable us to strive towards the attainment of a greater understanding, which in turn should indicate to all the way to happier relations and more contented conditions between man and man, and nation and nations.

MR. KINSMAN:

Thank you, Mr. President, I will ask Mr. Eastman to tender the Association's thanks to you, Sir, for your Presidential Address.

MR. EASTMAN:

Mr. Mayor, Mr. Chairman, Ladies and Gentlemen, our President's thought-provoking address ranges over a very wide field covering the interests and objects of our Association, and reviews generally what we may expect in the future. It is not generally realised, I think, to what extent our Association represents the electricity supply industry in this country. We do not publish statistics, and we have no organ which boosts our efforts, but the fact remains that we as an Association—our engineer members of this Association—are carrying responsibility of our Municipal Councils to an output of electricity in this country amounting to, I think, 2,240,000,000 units of electricity per annum. This is increasing at such a rate which will more than double that output in less than 10 years. The whole of that development of domestic supply and supply to ordinary small industries, that is to say all industries other than mining purposes, has been done by Municipalities with the assistance of our gatherings at Conventions such as this.

That good work has, I think, been helped by the fact that our Association is composed of Councillors as well as Engineers in the service of Municipal Councils. This provision in our Constitution, to which our President has referred, has brought about a valuable spirit of understanding which perhaps was lacking in the early days of the Association. And the objects of the Association to which he referred, Mr. Chairman, you will realise—we all realise—have nothing to do with the interests of the Engineers, they have to do with the interests of the electricity supply in general.

In your remarks, Mr. President, you referred to progress in the future. We are now, all of us, engaged in endeavouring to bring about progress in our electricity undertakings in the face of considerable difficulties in obtaining materials, particularly, and in meeting the requirements of consumers, in a country which is more electrically minded than

any country of which I have any knowledge. The extent of the electric mindedness of consumers is due very largely, I submit, to the methods by which Municipalities have endeavoured to expand their undertakings, not for their own benefit but for the benefit of the consumers, and so incidentally bringing about better amenities generally in their cities and townships. In the future, we must expect electricity to become of still greater importance in this country, an importance which, from the national standpoint, is now recognised and accepted by Government. It is because of the progress which is now being made so rapidly in various directions that I rather expect, as we all expect, that Mr. Foden will find still more arduous the carrying out of his Presidential duties during the coming twelve months, but we wish him every success in dealing with the problems which will be put to him to deal with, and we thank him very heartily for his thought-provoking address.

MR. KINSMAN:

Thank you very much Mr. Eastman. I will now ask Mr. Foden to resume his position of authority.

(Mr. Kinsman then relinquished the Chair in favour of the President, Mr. Foden).

PRESIDENT:

Mr. Mayor, Ladies and Gentlemen, before proceeding with the next item, I would just like to make one or two announcements. I have pleasure in advising delegates that Honorary Membership has been extended to them by the following Clubs, from the 11th to the 14th May, inclusive: Comrades' Club, East London Club, East London Golf Club, and West Bank Golf Club.

There is an alteration to the programme, if you will kindly make a note of it. If you turn to the Agenda you will note under Thursday, May 13th, at 2.30 p.m., a circle drive is referred to. That circle drive will now take place at 2.30 p.m. on Wednesday, the 12th. The reason for that is that the Wool people want this hall, so we have had to switch this around.

Those representatives to this Convention who have come by rail or air, I have to inform that a representative of the S.A.R. & H. Travel Bureau will be in attendance between 9 and 10 a.m. tomorrow, Wednesday and Thursday, for you to ascertain that your bookings are secured for your homeward trip.

VENUE OF NEXT CONVENTION

PRESIDENT:

The next item on the programme is the venue of our next Convention. I will call for proposals.

Cr. J. C. K. ERASMUS, J.P., Port Elizabeth:

Mr. President, Ladies and Gentlemen, on behalf of the City Council of Port Elizabeth, it is my privilege and pleasure to extend an invitation to this Association to hold its next Convention in Port Elizabeth. I had rather prepared myself to amplify that invitation but, after Mr. Kinsman's remarks this morning, I am precluded from any "trade talk." I can only say that the undoubted amenities of Port Elizabeth will be at your disposal and we can assure you of a very pleasant time, and that we will try to emulate the high standard of hospitality set by other centres. We hope you will accept.

PRESIDENT:

Thank you. Are there any other invitations? If not, I declare that the next Convention will be held at Port Elizabeth. I thank you, Councillor Erasmus, for the very kind invitation and I know Port Elizabeth will lay itself out to give us a welcome. Thank you very much indeed.

The next item of business is the election of a Vice-President.

ELECTION OF VICE-PRESIDENT

PRESIDENT:

As you know, the usual procedure is that the Vice-President is the Engineer

of the town to which we are going the following year. Now the town to which we are going, as you know, is Port Elizabeth, so ipso facto I presume Mr. Bradley will be your Vice-President. I shall be glad to have your comments on the matter or nominations.

Mr. FRASER, Johannesburg:

I have much pleasure in nominating Mr. Bradley as Vice-President of this Association.

Mr. NICHOLAS, Umtata:

I have much pleasure in seconding that nomination.

PRESIDENT:

Any other nominations? There being no further nominations I declare Mr. Bradley to be the Vice-President of this Association for the ensuing year.

Mr. BRADLEY, Port Elizabeth:

Mr. President, Ladies and Gentlemen, I thank you very much indeed for the honour conferred upon me and it will be my constant endeavour to carry out the duties of that office to the best of my ability.

ELECTION OF EXECUTIVE COUNCIL

PRESIDENT:

The next item, ladies and gentlemen, is to ask for nominations for the positions of Engineer Members on the Executive of this Association.

MAJOR RAFTERY, Durban:

I beg to move, Mr. President, Johannesburg, Cape Town and Durban.

Mr. FRASER, Johannesburg:

Mr. President, I have much pleasure in nominating Mr. Downey of Springs.

PRESIDENT:

The Engineer Members now before the meeting are Johannesburg, Cape Town, Durban and Springs. Are there any further nominations?

Cr. J. M. PRELLER, Pretoria:

I have pleasure in nominating Mr. Hugo.

PRESIDENT:

In regard to Mr. Hugo, we had a telegram from him asking to be excused from being re-elected to the Executive for the forthcoming year, but suggesting that Mr. Wilson be nominated if he would stand.

Cr. J. M. PRELLER, Pretoria:

I appreciate that but on my return I will discuss it with Mr. Hugo, and in the meantime I would like his name to go forward.

PRESIDENT:

May I remind you that it is not necessary for Durban to be nominated. Mr. Kinsman comes on to the Executive as Past President so that leaves Springs, Cape Town, Johannesburg and Pretoria.

Mr. ANDREW, King William's Town:

I would suggest that should Mr. Hugo not be available, we might consider Mr. Wilson as his deputy.

Mr. EASTMAN:

I think it is not proper to appoint a person as an alternative at this stage. If Mr. Hugo is unable to act, then presumably other arrangements will have to be made. In that case another electrical engineer would be appointed by the Council to fill the vacancy, but we should not elect an alternate to Mr. Hugo at this meeting.

PRESIDENT:

I agree with you, Mr. Eastman. As all members are aware, the greater part of our duties are conducted on the Rand and we should, therefore, have as many representatives as possible from there because they can get together more easily than if we had representatives scattered

about, and the better plan, I think, would be to confine our attention to Johannesburg, Cape Town and Springs and ask Mr. Hugo if he will take a seat on the Executive; failing that, it will be left to the Executive Council to appoint an alternate to Mr. Hugo. I put that to the meeting. Are you agreed or otherwise?

Agreed.

PRESIDENT:

I therefore declare Mr. Fraser, Mr. Eastman, Mr. Hugo and Mr. Downey the four Engineer Members on the Executive Council.

I now call for nominations for two Councillor Members; as you know, it is customary to have two Councillor Members on the Executive.

Mr. BRADLEY, Port Elizabeth:

I have pleasure in nominating the representative from Port Elizabeth as one of the Councillor Members.

Cr. J. B. JANSEN, Uitenhage:

I wish to second that.

Mr. KINSMAN:

Mr. President, it may assist if I explain what has been done in recent years and found beneficial. Although the election is in the discretion of the Convention, it is valuable to have on the Executive as Councillor Members representatives of the city or town of the President and the city or town of the Vice-President; it is in the City of the latter that the next Convention will be held and if we follow a useful precedent we will elect one Councillor Member each from East London and Port Elizabeth.

MEMBERS:

Agreed.

PRESIDENT:

That being agreed, I declare that Councillor Tiddy, East London, and Councillor Erasmus, Port Elizabeth, represent you as Councillor Members of the Executive Council. We now require two alternate Councillor Members in case these two gentlemen are unable to attend.

Cr. G. WALMSLEY, Benoni:

I would like to propose Durban and Johannesburg.

PRESIDENT:

Are there any other nominations? If not, I declare Durban and Johannesburg alternative Councillor Members.

The next item on the Agenda, ladies and gentlemen, is the Annual Report. I will call upon the Secretary to present that.

ANNUAL REPORT

SECRETARY AND TREASURER:

Mr. President, Members of the Association,

I have the honour to submit the Annual Report together with the Balance Sheet for the financial year ended 31st August, 1947.

ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS OF SOUTHERN AFRICA

REVENUE AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st AUGUST, 1947

AUDIT FEES			£6 6 0				
PRINTING AND STATIONERY			48 4 1				
SECRETARY'S SALARY			167 0 0				
RENT			48 0 0				
SECRETARIAL EXPENSES			51 3 6				
BANK CHARGES			5 13 6				
INSURANCE—Presidential Badge			1 0 6				
POSTAGE, Telegrams, Etc.			33 7 1				
TELEPHONE			9 1 2				
DONATION—World Power Conference			10 0 0				
DEPRECIATION—Furniture and Fittings			2 12 0				
				£382 7 10			
CONVENTION EXPENSES:							
Travelling Expenses, etc.			46 3 2				
Reporting			51 13 6				
Cost of Printing Proceedings			278 17 0				
			376 13 8				
Less—Sales Proceedings	£176 9 3						
Advertising	220 0 0						
	396 9 3						
Less—Commission on Advertising	42 14 0						
			353 15 3	22 18 5			
BALANCE—being excess of Revenue over Expenditure				305 13 5			
				£710 19 8			£710 19 8

SUBSCRIPTIONS			£681 9 0
INTEREST ACCRUED—UNION LOAN CERTIFICATES			27 0 9
I.M.E.A.			
Subscriptions Received	£5 8 0		
Less—Paid	2 18 1		
		2 9 11	

ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS OF SOUTHERN AFRICA

BALANCE SHEET AS AT 31st AUGUST, 1947

SUNDRY CREDITORS			£26 15 3
Payments in Advance	£23 2 0		
Sundries	3 13 3		
ACCUMULATED FUNDS			1,047 8 2
Balance—1st Septembebr, 1946	772 3 6		
Add—Excess of Revenue over Expenditure for the year ended 31st August, 1947	305 13 5		
	1,077 16 11		
Less—Presidential Badge written down	30 8 9		
			£1,074 3 5

PRESIDENTIAL BADGE			£1 0 0
Balance—1st September, 1946	£31 8 9		
Less—Written down	30 8 9		
FURNITURE AND FITTINGS			23 6 0
Balance—1st September, 1946	25 18 0		
Less—Depreciation	2 12 0		
SUNDRY DEBTORS			4 13 0
Subscriptions unpaid	3 3 0		
Sales Proceedings unpaid	1 10 0		
STAMPS ON HAND			0 5 9
INVESTMENTS—Union Loan Certificates			577 4 3
Cost	500 17 0		
Add—Interest Accrued	76 7 3		
CASH			467 14 5
In hand	22 9 9		
The Standard Bank of S.A. Ltd.	445 4 8		
			£1,074 3 5

C. KINSMAN, President.

A. T. TAYLOR, Secretary.

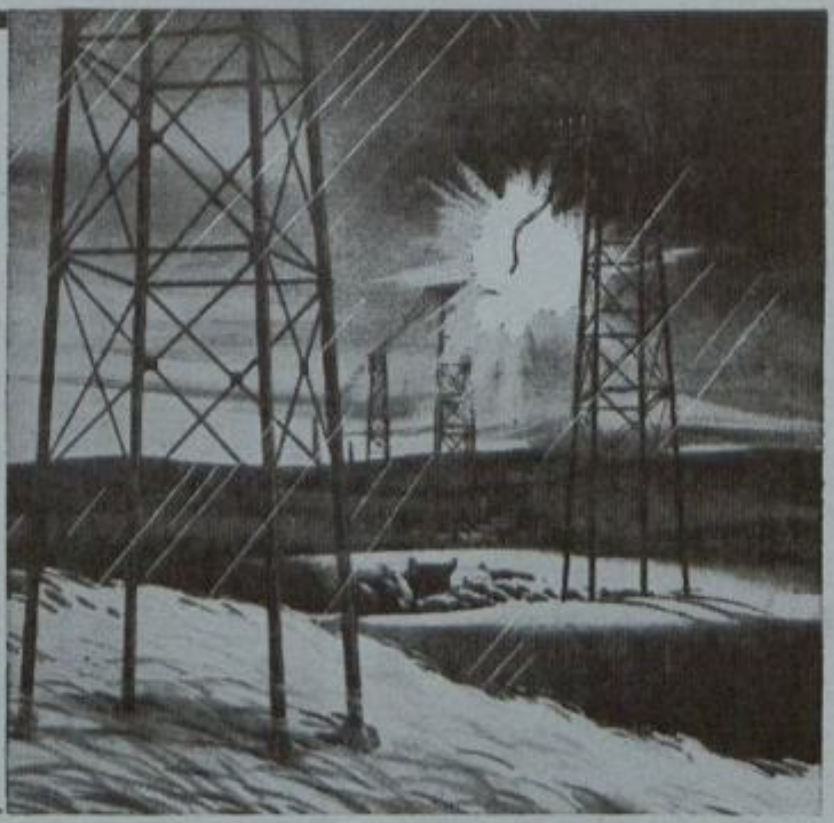
We report that we have examined the above Balance Sheet with the Books and Vouchers of the Association for the year ended 31st August, 1947, and certify that in our opinion the above Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of affairs of the Association as at 31st August, 1947, according to the best of our information, the explanations given us and as shown by the Books.

PRETORIA, 15th October, 1947.

(Sgd.) WARREN & HOFMEYER, Auditors.

The Switch must trip

Immediately the fault-finding relay locates the trouble, power must be available for tripping the switches. This calls for battery and equipment of utmost reliability.

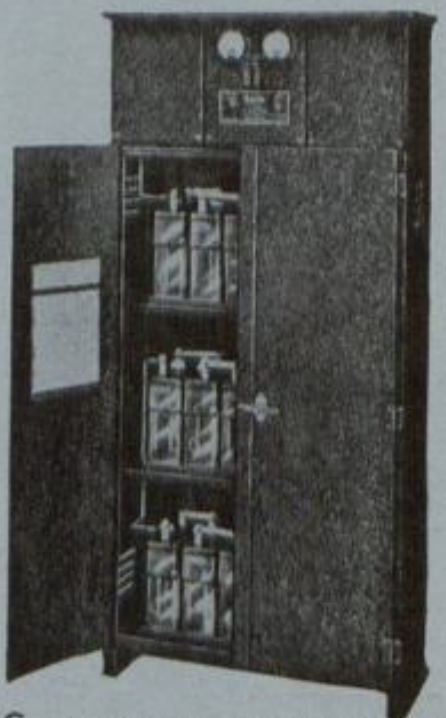


THE lead-acid battery on continuous trickle-charge is probably the most reliable source of energy for tripping high tension switchgear and requires minimum attention. It is eminently suitable for unattended substations, and has been standard equipment in numerous supply authorities' areas for many years.

The standard equipment embodies pasted plate cells of the special "Low-Loss" type, but sealed-in plante cells are also available. The latter are recommended wherever the switch-tripping load is particularly heavy and in all cases where maximum durability is of greater importance than first cost.

It is never necessary to remove the trickle-charged battery for quick-rate recharging unless, of course, special circumstances have caused the battery to be subjected to an exhaustive discharge.

The only maintenance requirements are a periodical examination—say at intervals of six weeks—to test specific gravity, top up the cells and, if necessary, adjust the trickle-charge rate. Battery voltage readings under load conditions can be taken by means of the voltmeter and push button mounted on the cabinet.



The method of housing the battery is optional; it can be supplied either in a steel cabinet in keeping with the metal-clad switchgear usually employed in high tension substations, or placed in a wood cabinet. As supplied to: S.A.R. & H., Electricity Supply Commission, Iscor, Steel Sales Co. of Africa (Pty.), Ltd., Vanderbijl Engineering Corporation, Ltd., Municipal Electrical Undertakings, Gold Mines.

Exide SWITCH-TRIPPING EQUIPMENT

Switch-Tripping Equipment has other uses, such as: Supervisory Equipments, Electric Impulse Clocks, Burglar Alarms.

THE CHLORIDE ELECTRICAL STORAGE COMPANY (S.A.), (PTY.), LTD., P.O. Box 7058, JOHANNESBURG

OBITUARY

I regret to have to record the death of Mr. A. J. Verryn, of Middelburg, Transvaal, and Mrs. Ritson, wife of Mr. R. W. Ritson, of Stellenbosch.

TWENTY-FIRST CONVENTION

The twenty-first Convention of the Association was held in Durban from Tuesday, the 6th, to Friday, the 9th May, 1947. In all, 215 members, delegates, and visitors attended, and I feel I can safely say and all will agree with me that both from a business and social point of view, the Convention was an unqualified success.

The Papers presented once again proved to be of a high standard, and the discussions showed that the subject matters were of great interest to Council and Engineer members as well as to delegates and visitors.

The Association's thanks and appreciation is due to the Mayor and Council of Durban for the entertainment and facilities provided and to the various officials who assisted in making our stay in Durban such an enjoyable one.

1948 CONVENTION

The Association has received an invitation from the City Council of East London to hold its next Convention in East London from the 11th to the 14th May, 1948, which period incidentally coincides with the Centenary year of East London.

FINANCIAL

The Balance Sheet for the year ended 31st August, 1947, is attached, from which it will be noted that revenue exceeded expenditure by an amount of £305 13s. 5d., which may be considered reasonably satisfactory.

I wish to place on record the Association's appreciation of the support given by Council Members and Advertisers, without whose financial aid, a surplus would not have been possible.

STATISTICAL TABLES

Members are reminded that these Statistics are being compiled by Mr. L. L. Horrell, M.I.E.E., 139 Brook Street, Brooklyn, Pretoria, and that the South African Municipal Year Book is published by the South African Association of Municipal Employees, P.O. Box 62, Pretoria, to whom all communications in connection with the Tables, etc., should be addressed.

MEMBERS

The following members were elected during the year under review:—

Council Members:

Butterworth.
Greytown.
Vrede.
Vryheid.
Willowmore

Engineer Members:

B. W. Cowley, Borough Electrical Engineer, Newcastle; D. R. Milln, Town Engineer, Blantyre; E. W. Mole, Municipal Electrical Engineer, Walmer; A. W. H. Hadfield, Municipal Electrical Engineer, Gwelo; T. Kramer, Electrical Engineer and Assistant Town Engineer, Potchefstroom; R. J. S. Wylie, Electrical and Waterworks Engineer, Louis Trichardt; T. H. Havenga, Town and Electrical Engineer, Kuruman; W. G. Thackwray, Town Electrical Engineer, Kokstad;

D. V. S. Dreyer, Town and Electrical Engineer, Brandfort; N. Ferreira, Town Engineer, Zastron; L. J. Roberts, Municipal Electrical Engineer, Matatiele; C. Lombard, Assistant City Electrical Engineer, Bloemfontein; G. A. Lotter, Town Engineer, Ermelo; J. T. Williams, Town and Electrical Engineer, Harrismith; G. S. Fainsinger, Municipal Electrical Engineer, Mossel Bay; G. Aalbers, Municipal Electrical Engineer, Robertson; C. G. Downie, Deputy City Electrical Engineer, Cape Town; M. J. W. Chappel, Electricity and Water Engineer, Port Shepstone; R. Tarran, Municipal Electrical Engineer, Benoni.

The membership during the year was increased by five Council members and 19 Engineer members. The comparative figures for 1946 and 1947 are as follows:

	1946	1947
Honorary Members	5	4
Council Members	71	76
Engineer Members	63	82
Associate Members	2	1
Associates	24	24

Whilst on the subject of membership, members will no doubt recollect that it was decided during the year to appeal to Councils who operate Electricity Undertakings and were not members of the Association, as well as their Engineers, to become members. A strong appeal was sent out to 153 Councils, and as a result, we have enrolled 12 new Council members and five Engineer members. While the response was not as good as one might have expected, the subscription for the first year from those who have joined more than covered the expense of circularising, and further membership is expected during the current year where Councils have intimated that the matter is under consideration. A number of Councils have replied that they are not prepared to become members, and in some cases, that their electricity supply being furnished by the Electricity Supply Commission, they have no Electricity Departments. From a number no replies have been received up to date, and it is the intention of your Secretary to again communicate with them in the near future.

Once again I appeal to members when changing their occupation or address to notify the Secretary of such changes, as it would greatly facilitate keeping a record of members and incidentally save unnecessary correspondence.

EXECUTIVE COUNCIL MEETINGS

It is pleasing to be able to report that it has been accepted in principle by Councils that the necessary facilities will be given to members of the Executive Council to attend meetings in between Conventions. Only one Executive Council meeting was held between the Bloemfontein and Durban Conventions due to the period of the Royal Visit coinciding with the tentative date fixed for the second meeting. It is, however, hoped that at least two Executive Council meetings will be held during the current financial year of the Association, the first of which is scheduled to take place at Bloemfontein on the 15th September, 1947.

In conclusion, I wish to thank the President and members of the Executive Council for their advice, assistance, and the courtesy at all times extended to me.

I remain,

Mr. President and Gentlemen,

Yours faithfully,

A. T. TAYLOR,

Secretary and Treasurer.

Mr KINSMAN:

Mr. President, I would like to move formally the adoption of the Annual Report of the Executive and, in doing so, to pay tribute to the work put in on our behalf by the Secretary. We have found, I would say, the ideal Secretary in Mr. Taylor, who is most attentive to his work and most prompt in his correspondence; it is in no small measure due to his assiduous following up of our decision to approach municipalities in South Africa who are not members of this Association with a view to becoming members that we have our present strength; we would be failing in our duty if we did not record our very high appreciation of Mr. Taylor's work for us, and I couple with that a formal motion of adoption of the Report.

Mr. G. J. MULLER, Bloemfontein:

I second the adoption of the Report.

PRESIDENT:

I take it that the Report will now be adopted and I ask the Treasurer to present the Balance Sheet.

SECRETARY AND TREASURER:

Mr. President, Ladies and Gentlemen, this Balance Sheet was circulated to all members and there is just one little point I would like to mention here: that is, in the Annual Report I gave the excess of revenue over expenditure as an amount of £258 18s. 2d., whereas in the balance sheet it is shown as £305 13s. 5d. This was due to the fact that I submitted a draft report to the Executive Council at its meeting on the 15th September, and gave the figure of £258 18s. 2d. Certain adjustments subsequently made by the Auditors to the balance sheet I omitted to rectify in the Report.

There is nothing else I can say, except as mentioned previously, it is very gratifying to have a surplus for that particular year's working of £305. You will note that we have investments to the extent of £500 in Union Loan Certificates. The accrued interest thereon was £76, and at the 31st August, 1947, we had cash in hand and at the Bank amounting to £467 14s. 5d. Thank you.

Mr. FRASER, Johannesburg:

Mr. President, Ladies and Gentlemen, as a member of your Sub Committee, I have very much pleasure in moving that the Balance Sheet, as explained by our Secretary and Treasurer, be adopted.

Mr. DOWNEY, Springs:

I second that.

PRESIDENT:

Are you all in agreement with its adoption?

Agreed.

ELECTION OF MEMBERS OF COMMITTEES

PRESIDENT:

For your guidance, you will note that the Association is represented on the South African Standards Institution by Mr. J. C. Downey, alternate, Mr. D. J. Hugo; the S.A. Bureau of Standards and other Committees by Mr. Downey, alternate, Mr. Hugo; Meter Testing Code by Mr. Downey, alternate, Mr. Hugo; Wiremen's Registration Board by Mr. J. C. Fraser; Safety Precautions by Mr. Downey, alternate Mr. Fraser; Overhead Lines Regulations by Mr. Fraser, alternate, Mr. G. J. Muller, and World Power Conference (Local Committee) by Mr. H. A. Eastman. I would like to know whether you would like to re-elect those gentlemen for the ensuing year.

Mr. BRADLEY, Port Elizabeth:

Mr. President, Ladies and Gentlemen, in asking the Convention to accept the names in toto, I do so in the knowledge that these gentlemen have conducted their work not only in the interests of the Association but most admirably in the interests of the profession as a whole. I have much pleasure in asking you to accept that the several Committees be

represented by the names opposite the Committees on the Agenda.

PRESIDENT:

It is proposed by Mr. Bradley that the names appearing against the various Committees remain for the ensuing year. Will someone second that?

Mr. KINSMAN, Durban:

I would like to second the motion and, in doing so, to draw the attention of members to the very heavy duties devolving upon our memberse in th eTransvaal. One will see by the repetition of the names of Mr. Downey, Mr. Fraser and Mr. Hugo that those gentlemen have readily done the work at considerable sacrifice to themselves and for that we are deeply indebted to them.

PRESIDENT:

I can endorse everything the Past President has said in regard to the duties these gentlemen have carried out in the past year and it is a pity that they could not have had some relief, but that is the position as it stands and the fact is, of course, that there is a vast distance separating the centres, and if there are no further comments, I declare Mr. Downey, with his alternate, Mr. Hugo, as members of the S.A. Standards Institution, and so on down that list on the Agenda as representatives of those Committees for the ensuing year. Is that agreed?

MEMBERS:

Agreed.

VENUE OF NEXT CONVENTION

There is just one item I would like to announce and that is in connection with the venue of the next Convention. The subject of the date was discussed by your Executive yesterday and it was considered that April would be a suitable time to the Port Elizabeth Council, who have kindly invited us to go there. I throw that open to the meeting for a short time to see if it meets with the approval of the Port Elizabeth authorities and Members.

Cr. C. G. THOMPSON, Johannesburg:

Mr. President, in discussing the question of an alteration in the date, I think the reasons behind that were mostly from the point of view of Council members rather than officials. I would point out in certain instances that the Council Members also have to attend a Transport Convention which normally takes place in April, and I would like this Convention to consider that generally speaking the set up in these two Conventions has worked satisfactorily. There is one exception, Bloemfontein, where they found some difficulty, but I would suggest the Convention considers the desirability of not making any alteration in this respect.

Mr. MEINTJES, Rustenburg:

As an Engineer Member, I would like to see the Convention a little earlier. We, from the smaller towns, have a lot of trouble with our winter loads and if we could have the Convention before that comes along, it would suit us very much better.

Cr. ERASMUS, Port Elizabeth:

As far as Port Elizabeth is concerned, we have no particular date in mind. As for winter load, the earlier you come the more you are assured of not sitting in darkness.

Mr. MULLER, Bloemfontein:

My Chairman is not here yet and it should really have come from him because it concerns him more than it does me, as our elections take place early in the year. It requires at least three months for booking, and at the time of booking it is not at all certain who will be the Councillor to attend the Convention and, therefore, the booking is left in general terms for a councillor; in other words, it is not certain whether he will be accompanied by his wife or not. No finality can be come to with regard to the bookings and I do think it is very desirable to be able to keep in contact with your Chairman if possible, and it is much more convenient if you are at the same hotel.

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Sitting, On Floor:—P. A. Giles (East London), Cr. J. C. K. Erasmus (Port Elizabeth).

2nd Row:—A. T. Taylor, Secretary (Johannesburg), G. J. Muller (Bloemfontein), J. C. Downey (Springs), J. C. Fraser (Johannesburg), H. A. Eastman (Cape Town), A. Foden, President (East London), D. Lazarus, Mayor (East London), Mrs. D. Lazarus, Mayoress (East London), D. A. Bradley (Port Elizabeth), C. Kinsman (Durban), E. H. Tiddy, Deputy-Mayor (East London), Mrs. E. H. Tiddy, Deputy-Mayoress (East London), Cr. Major J. Raftery (Durban).

3rd Row:—Mrs. J. C. Downey (Springs), Mrs. A. Foden (East London), A. Hadfield (Gwelo), D. Ritson (Stellenbosch), G. E. H. Jones (Mafeking), W. Mortimer-Mail (Kokstad), H. M. McKenzie (East London), H. O. Smith (Pretoria), Mrs. J. J. de Haas (Pretoria), J. J. de Haas (Pretoria), H. L. Groom (Roodepoort), H. A. McIntyre (Middleburg, Tvl.), Mrs. C. E. Gregor (Alberton), Mrs. J. J. Schoeman (Alberton), Cr. J. J. Schoeman (Alberton), C. E. Gregor (Alberton).

4th Row:—Mrs. A. R. Sibson (Bulawayo), Mrs. H. D. T. Harris (Johannesburg), Cr. H. Quick (Ladysmith), Cr. C. E. Young (Pietermaritzburg), Mrs. H. Quick (Ladysmith), Mrs. C. G. Thompson (Johannesburg), Mrs. D. A. Bradley (Port Elizabeth), Mrs. P. A. Giles (East London), P. H. Newcombe (George), Cr. W. B. Jackson (Krugersdorp).

5th Row:—Mrs. J. C. Fraser (Johannesburg), Mrs. H. A. Eastman (Cape Town), J. H. Rogers (Fort Beaufort), L. L. Horrell (Pretoria), T. Ashley (Queenstown), Cr. D .A. Stumke (Roodepoort-Maraisburg), C. R. Burton (Kimberley), Cr. I. M. Preller (Pretoria), Mrs. C. H. Dwyer (Stanger), C. H. Dwyer (Stanger).

6th Row:—R. T. Urquhart (Johannesburg), I. J. Nicholas (Umtata), Mrs. N. Ferreira (Odendaalsrust), N. Ferreira (Odendaalsrust), Cr. Mrs. J. Stoffberg (Randfontein), F. G. McDonald (Pietermaritzburg), Major S. G. Redman (Johannesburg), Cr. C. G. Thompson (Johannesburg), Cr. J. Lamberton (Johannesburg), Cr. Major J. W. B. Billingham (Cape Town), G. S. Fainsinger (Mossel Bay), D. J. R. Conradie (Ficksburg), Mrs. J. H. Rogers (Fort Beaufort), Cr. C. J. Truscott (Mafeking), Cr. H. W. Kruger (Vereeniging), G. A. Dalton (Johannesburg), J. L. v. d. Walt (Krugersdorp).

7th Row:—F. H. Tyler (Johannesburg), W. N. Powell (Johannesburg), J. T. Williams (Harrismith), Mrs. P. C. Grandin (Vryburg), Mrs. G. Drewett (Johannesburg), Mrs. P. N. Lategan (Johannesburg), Mrs. I. J. Nicholas (Umtata), F. C. Kempster (East London), A. R. Sibson (Bulawayo), Mrs. G. N. Liddell (Bulawayo), Cr. G. N. Liddell (Bulawayo), G. S. Clarke (Pretoria), J. Ritchie (Pretoria), J. S. Craig (Greytown), W. Bellad-Ellis (East London), A. Rossler (Cradock), C. H. Adams (Oudtshoorn), Cr. P. J. S. de Wet (Stellenbosch), W. M. Andrew (King William's Town), Cr. J. P. Bezuidenhout (Edenvale) R. W. Barton (Edenvale), Cr. J. B. Jansen (Uitenhage), J. A. Matthews (Uitenhage), A. L. Sanders (Johannesburg), P. L. Vergottini (Brakpan), J. Wilson (Pretoria), Mrs. S. J. Thomas (Brakpan), B. Marchand (Witbank), G. Aalbers (Robertson), Cr. W. P. Andersen (Rustenberg), P. A. Meintjes (Rustenberg), R. W. Hayman (Johannesburg), Mrs. R. W. Hayman (Johannesburg), G. Poole (Johannesburg), J. D. McNeil (Johannesburg), J. A. England (Port Elizabeth), V. E. O. Barrett (Graaff Reinet), A. E. Torrance (Johannesburg), W. G. H. Jarvis (Johannesburg), A. S. Paice (Cape Town), R. D. Wright (Johannesburg).

8th Row:—G. E. Mossop (Vrede, O.F.S.), Dr. P. N. Lategan (Johannesburg), G. Drewett (Johannesburg), R. McNally (East London), J. Russell (Johannesburg), R. J. P. Green (Johannesburg), Mrs. R. J. P. Green (Johannesburg), E. A. McWilliam (Pretoria), C. E. R. Langford (Johannesburg), J. R. Cherry (Randfontein), Cr. G. L. E. Venter (Cradock), W. Rossler (Kroonstad), E. R. J. Smith (Johannesburg), J. E. Mitchell (Salisbury), Cr. R. M. Cleveland (Salisbury), Morton Jaffray, Mayor (Salisbury), Mrs. Morton Jaffray, Mayoress (Salisbury), K. M. Johnston (Johannesburg), A. W. Allen (Cape Town), Cr. W. J. Ebertson (Brakpan), Cr. S. J. Thomas (Brakpan), J. W. Allen (Port Elizabeth), Cr. P. A. Venter (Boksburg), E. L. Smith (Boksburg), W. Theron (Worcester), F. Stevens (Ladysmith).

9th Row:—Cr. A. N. Field (Worcester), J. I. Inglis (Pietersburg), S. G. Mortimer (Johannesburg), R. G. Hunter (Johannesburg), H. D. T. Harris (Johannesburg), T. R. Strawson (Johannesburg), G. D. Gelling (Johannesburg), Cr. H. H. Holtzhausen (Potchefstroom), T. Kramer (Potchefstroom), J. Iverach (Grahamstown), D. A. D. Adams (Grahamstown), E. H. McCarthy (London), Cr. J. E. N. de Jong (Robertson), J. M. Taylor (Johannesburg), G. V. Jackson (Johannesburg), E. W. Ramsay (Port Elizabeth), R. T. Park (Port Elizabeth).

10th Row:—Cr. Dr. F. A. S. van Reenen (Kroonstad), Cr. J. D. C. Baxter (Kimberley), Cr. W. Havenga (Potchefstroom), P. C. Asselbergs (Barberton), T. Mocke (Piet Retief), P. C. Grandin (Vryburg), J. H. White (Ndola, N. Rhodesia).

11th Row:—W. H. Milton (Johannesburg), R. Tarran (Benoni), Cr. G. Walmsley (Benoni), R. R. Lyall (Nelspruit), J. C. Robertson (Cape Town).

Mr. SMITH, Boksburg:

I would like to suggest we have it in March, because in April and May we are busy with estimates which are of a very contentious nature and I suggest March would be a suitable month.

PRESIDENT:

We seem to be getting into very deep water. I think we have found that April or May are the most suitable months, and I think we should confine it to those two months. Will someone move that we hold it in Port Elizabeth in April or May?

Mr. MEINTJES, Rustenburg:

I would like to formally move that we have the Convention in April.

Mr. MULLER, Bloemfontein:

I second that.

Cr. ERASMUS, Port Elizabeth:

The only point is that the 15th April is Easter and it will be very difficult to procure bookings. It will have to be earlier or later.

Cr. P. A. VENTER, Boksburg:

It also clashes with the Rand Show. I move that we have the Conference in May.

Cr. WALMSLEY, Benoni:

I second that.

PRESIDENT:

Will members please vote for the amendment, that the Convention be held in Port Elizabeth in May.

54 voted for the amendment and 17 against.

PRESIDENT:

I formally announce then that we have the next Convention in May next year. All agreed?

MEMBERS:

Agreed:

We will now adjourn and proceed to the Civic Luncheon at Deal's Hotel, which is at a quarter to one.

Adjourned at 12.25 p.m.

The Convention resumed on WEDNESDAY, the 12th May, 1948, at 9.40 a.m.

PRESIDENT:

Will you excuse the Executive for the delay—the Executive Agenda was a little formidable.

SECRETARY:

I have a telegram from Upington Municipality which reads:—

"Delegates unable to be present: best wishes for successful Conference."

PRESIDENT:

I am very pleased to say that we made very good progress yesterday, ladies and gentlemen, with your assistance, and I will now deal with item No. 7 on the Agenda, under the heading of Reports of Sub-Committees. The first one is World Power Conference and I will ask Mr. Eastman to give his report.

WORLD POWER CONFERENCE

Mr. EASTMAN, Cape Town:

Mr. President, Ladies and Gentlemen, my report has been handed around. It records that a Fuel Economy Conference was held at the Hague in 1947, at which a large number of very interesting Papers was presented, a list of which is attached to the report. Your Association, which is a member of the National Committee of World Power Conference, has obtained two sets of copies of the Papers and your Executive Council has resolved to buy a bound set of these Papers and that, together with the individual Papers which have been described in the annexure to the Report, will be available to members, on loan.

The Conference was not attended by a representative of our Association because there did not happen to be one of our members over there at the time, but I think our Association will find that its membership of this body will be of interest to it in receiving papers of this kind, which deal with problems of the kind which we are facing locally, and the Papers being available to members, on loan, will be of value I have no doubt. Appended to the Report is also a statement of the finances of the South African National Committee of this organisation.

REPORT ON WORLD POWER CONFERENCE

I have to report that a Fuel Economy Conference was held at The Hague in September, 1947, under the auspices of the World Power Conference organisation which was well attended by representatives from many countries.

A copy of a list of the lectures and papers presented at the Conference is appended to this report. Two sets of the papers are in the possession of our Association. The Proceedings of the Conference, including all papers read, ensuing discussions, lectures and the various addresses delivered are being published in book form by the Netherlands Institute of Electroheat and Electrochemistry.

Unfortunately circumstances did not permit of a member of our Association attending the Conference.

The International Executive Council of the World Power Conference will be held in Stockholm on the 7th and 8th June, 1948.

The South African National Committee of the World Power Conference has been invited to be represented at the following Conferences:—

(a) Third Congress of the International Commission on Large Dams to be held in Stockholm from the 10th to the 17th June, 1948.

(b) Twelfth Session of the International Conference on Large Electric High Tension Systems (C.I.G.R.E.) to be held in Paris from the 24th June to the 3rd July, 1948.

The Union Government has nominated two of its engineers to attend the first-mentioned Conference.

An invitation for representatives from the Union of South Africa to be present at the C.I.G.R.E. Conference has been received direct from that body as well as through the Union Government at whose request the question of nominating delegates has been referred to the Associated Scientific and Technical Societies of South Africa.

A statement of accounts for the period 1st January, 1939, to 31st December, 1947, of the South African National Committee of the World Power Conference is also attached for the information of our members.

H. A. EASTMAN,
Representative to the World Power Conference
(Local Committee).

SOUTH AFRICAN NATIONAL COMMITTEE — WORLD POWER CONFERENCE

RECEIPTS AND PAYMENTS ACCOUNT FOR THE PERIOD 1st JANUARY, 1939, TO 31st DECEMBER, 1947

PAYMENTS

To payments made to World Power Conference—Central Office (London) Maintenance Fund in respect of the years:—			£180 0 0
1939	£40 0 0		
1940	40 0 0		
1946	50 0 0		
1947	50 0 0		
„ Exchange on above payments			1 2 0
„ Books, Publications, Printing and Stationery			10 19 5
„ Cables and Postages			3 12 9
„ Bank Commission			0 1 7
„ Balance being excess of receipts over payments			31 6 2
			£227 1 11
„ Balance at 31st December, 1947			£102 9 3
			£102 9 3

RECEIPTS

By Subscriptions Received for the years, 1939, 1940, 1946, 1947			£223 2 0
Electricity Supply Commission	£40 0 0		
The Victoria Falls & T.P. Co. Ltd	40 0 0		
South African Railways & Harbours	40 0 0		
Association of Municipal Electricity Undertakings of South Africa and Rhodesia	40 0 0		
Department of Mines	20 0 0		
South African Institute of Engineers	8 8 0		
South African Institute of Electrical Engineers	8 8 0		
Associated Scientific and Technical Societies of South Africa	20 0 0		
For the years 1939, 1940, 1946:			
S.A. Society of Civil Engineers	6 6 0		
„ Sale of Publications			3 19 11
			£227 1 11
„ Balance brought forward from 1938			£71 3 1
„ Excess of receipts over payments for period 1st January, 1939, to 31st December, 1947			31 6 2
			£102 9 3

JOHANNESBURG, 20th January, 1948.

G. R. D. HARDING, Secretary.

SCHEDULE OF PAPERS PRESENTED AT THE FUEL ECONOMY CONFERENCE OF THE 1947 WORLD POWER CONFERENCE

Reports on Fuel Economy since 1939:—

Algerian Committee (In French).
Argentine National Committee.
Australian National Committee.
Austrian National Committee.
Belgian National Committee
British National Committee
Czechoslovak National Committee.
Danish National Committee.
Finnish National Committee.
French National Committee.
Germany—Allied Control Commission.
Hungary.
Irish Committee.
Netherlands National Committee.
Norwegian National Committee.
Portugeuse National Committee.
United States National Committee.
Swedish National Committee.
Swiss National Committee.

Papers:—

Section	Paper No.	Title	Author
A1	1.	National Gas Reserves in U.S.A.	American Gas Association.
	2.	The British Coal survey as a factor in fuel economy	Parker & Maries.
	3.	La Production de L'energie en France	P. Salmon.
	4.	Canadian Coals; their characteristics and utilisation	Gilmour & Burrough
A2	1.	Coal Mining and Equipment in U.S.A.	I. Given.
	2.	L'evolution de la technique Houillere Francaise	C. Renin.
	3.	Utilisation of Lignite fields in Czechoslovakia	J. Ludmila.
	4.	Sampling of Coal and Washery Products	J. Visman
	5.	Developments in British Coal Face Mechanisation	Hay & Richardson.
	6.	Recent Developments in Coal Washing	G. Driessen.
A3	1.	Aviation fuel production	Oriel & Gordon.
	2.	Evolution de Quelques Techniques de Synthese et de Remplacement Aspects Energetiques	Jacque et Guesdon.
	3.	Adeption des Techniques Modernes et Etrangeres a L'industrie Francaise du Raffinage	R. Perrin.
	4.	Production of Shale Oil in Sweden	E. Schjanberg.
	5.	The Bituminous sands of Alberta, Canada, as a source of Liquid Fuels	Warren & Bowles.
	6.	"Dark Fuels": Diesel, Boiler and Gas Turbine	J. J. Broeze.
	8.	Carbohydrates and Related Constituents of Plant Tissues as a supplement to Coal and Petroleum	E. L. Ritman.

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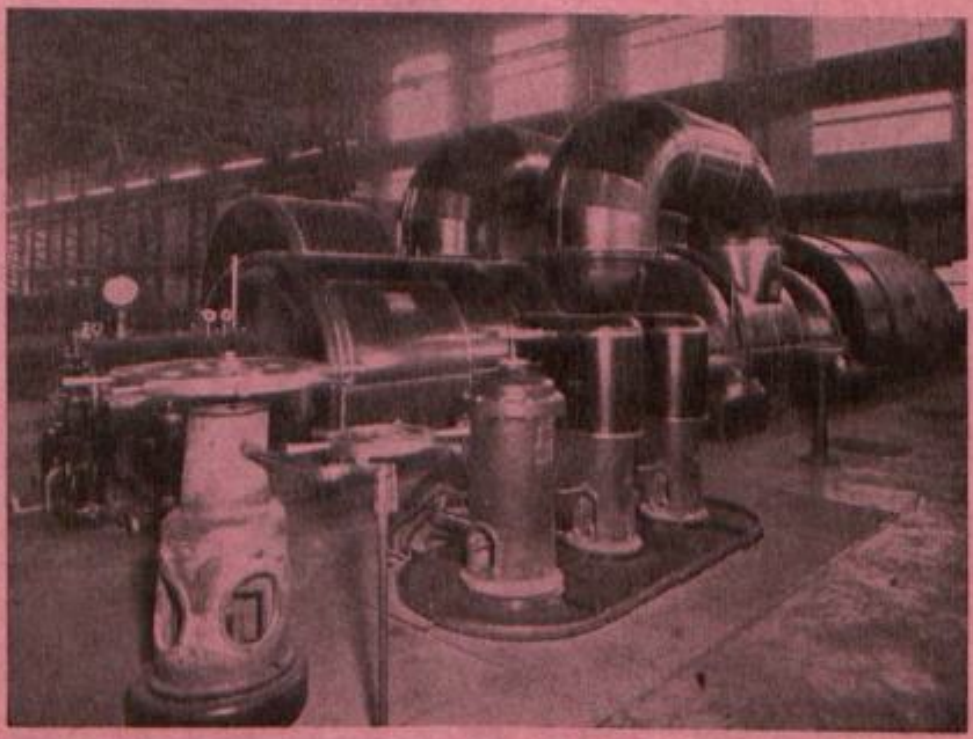

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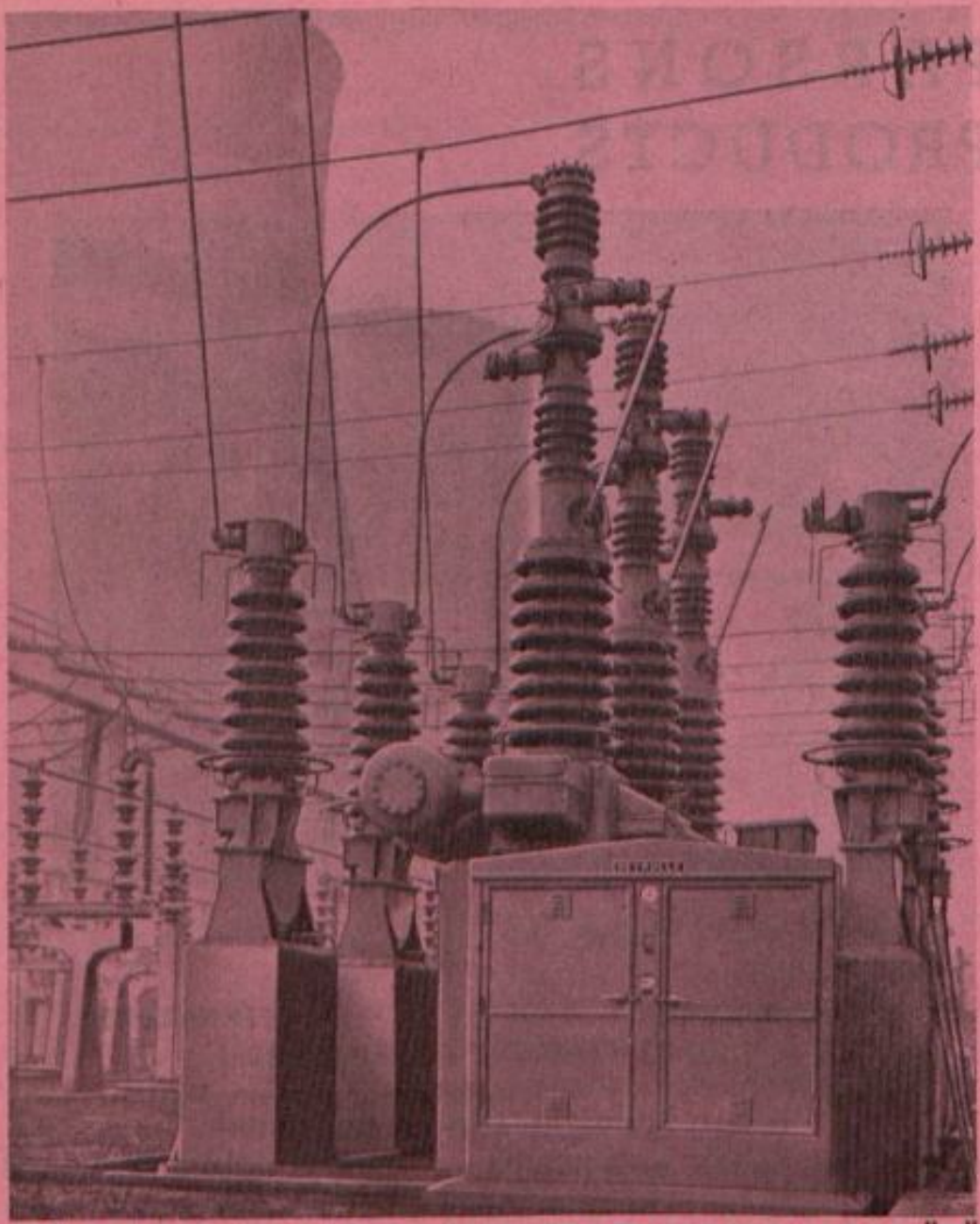

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Section	Paper No.	Title	Author
A4	1.	Fuel Economy in Coal Carbonisation	T. C. Finlayson.
	2.	The Dry Cooling of Coke at Coke Ovens and Gasworks	W. Hersche.
	3.	Gas Production and the Chemical Industry	J. van Aken.
	4.	A steam-saving process for Benzole Extraction in Gasworks and Coke Ovens	H. Deringer.
	5.	Comment et Pourquoi la Gazeification Souterraine Peut Ameliorer la Prix du KWH	M. Demart.
A5	1.	Co-ordination of Electricity Supply — The British Grid in Wartime	Sir J. Wright.
	2.	Les Trafics possibles dans les Grandes Interconnexions Futures	M. Ailleret.
	3.	The Electrical Power Industry in China	Chen & Sunn.
	4.	Interet Economique des Interconnexions Realisations Effectures et Resultats Obentus en Belgique	M. Zochkoltz.
A6	1.	Nuclear Energy for Power Production	W. F. Davidson.
	2.	L'energie Atomique en France	L. Kowarski.
	3.	The application of Nuclear Energy to the Generation of Heat and Power	J. D. Cockcroft.
B2	1.	La Production de L'energie Electrique dans L'industrie Siderungique de l'est de la France	A. Evain.
	2.	Les Transports Petroliers Interieurs	M. Rouelle.
	3.	Les Transports de Gaz en France	Fluerquin & Malherbe.
	4.	Estimation de la Distance Economiqur de Transport du Gaz	M. van den Henden.
	5.	Long distance transmission of Gas from works making gas for carbonisation and high pressure processes	R. Riedl.
B3	1.	Transmission de L'energie a longue distance au Moyen de la Vapeur a moyenne Pression	P. Houbin.
C1	1.	L'utilisation des Sources D'energie en France de 1939 a 1946	P. Salmon.
C2	1.	Burning crushed low grade coal in a Cyclone Burner	L. Wilcoxson.
	2.	The Function of Convection and Radiation in Heating by Gas	Andrew & Roberts.
	3.	Deposits on the External Heating Surfaces of Boiler Systems	H. Crossley.
	4.	Advances in Motor Fuel Manufacturing Processes leading to better Fuel Economy	Murphy, Blackwood & Patterson.

Section	Paper No.	Title	Author
	5.	Prochains Emplois de la Turbine a Gaz en France	M. Roy.
	6.	Furnaces for Special Fuels	O. de Lorenzi.
	7.	The Dependence of Gas Turbine Economy on Internal Aerodynamic Design	Cox, Howell & Smith.
	8.	Spreader Stokers in U.S.A.	R. L. Beers.
	9.	A New Metal Recuperator for High Temperature Furnaces	H. Escher.
	10.	The Recovering of Industrial Low-grade Heat	Macfarlane & Mason.
	11.	Heat Recovery from Waste Liquors in Swedish Wood Pulp Mills	G. Edling
	12.	Electronic Control of Combustion in Steam Boilers	Z. Ryska.
	13.	The Gas Turbine as a means of Securing Additional Output of Power	W. Karrer.
	14.	Metallurgical Uses of High Frequency Furnaces in Sweden	L. Hogel.
	15.	Use of Raw Brown Coal on Industrial Stokers	Stewart, Nicholson & Reinbach.
	16.	New Ways of Burning Liquid Fuel	Putte & Bussche.
	17.	Combustibles Pour Moteur a Air Chand	H. de Brey.
C3	1.	Trends in the Development of Domestic Gas Appliances in the U.S.A.	Milener & Zare.
	2.	Energy Problems in Hospitals and other Public Institutions in Sweden	G. Zimmerman.
C4	1.	L'utilisation de L'energie dans la Transports Maritimes	H. Thery.
	2.	Comparison des Differentes Formes D'energie Utilisees dans les Transports par Chemin de Fer	R. Dugas.
	3.	Some Results of Electric Traction in the Swedish State Railways	Th. Thelander.
C5	1.	Combined Steam and Electricity Supply in New York	Davidson & Steinberg.
	2.	Electric Warming of Buildings in Norway	A. O. Hals.
	3.	District Heating	M. C. Hoenkamp.
	4.	District Heating and Combined Power-Heat Generation in Denmark	Bak & Geertsen.
	5.	L'economie des Combustibles et le Chauffage des Locaux	A. Nessi.
	6.	Developments in the Heating of Buildings in Sweden	Jonsson & Lagerstedt.

PRESIDENT:

Thank you Mr. Eastman for your comments on the World Power Conference.

The next two items will be dealt with by Mr. Fraser and he will incorporate items 7 (ii) and (iii). Mr. Fraser, will you be good enough to present your report on these two subjects.

ELECTRICAL WIREMEN'S REGISTRATION BOARD

Mr. FRASER, Johannesburg:

Gentlemen, I have great pleasure in presenting a brief review of the Wiremen's Registration Board's activities for the year 1947.

(1) Personnel of Board

Mr. W. F. Joubert, Chief Inspector of Factories, retired on Superannuation from the Government's service in October, 1947, and his seat on the Board was taken by Mr. H. O. Smith, who succeeded Mr. Joubert as Chief Inspector of Factories.

Mr. Smith was also appointed by the Minister of Labour as Chairman of the Board in succession to Mr. Clutterbuck, whose term of office in that capacity expired at the end of the year.

During his unbroken period of office as Chairman (8 years), Mr. Clutterbuck rendered valuable service to the Board. He not only organised the functions of the Board and clerical staff attached thereto, but, as a result of his wise counsel and experience, he guided the Board in the establishment of certain fundamental principles in dealing with the administration of the Act. This ensures that all applicants are treated impartially whilst at the same time maintaining the highest possible standard of competence in wiremen eligible for registration. Mr. Clutterbuck organised a system of examinations which functions efficiently and almost automatically, thus ensuring the maintenance of a high standard throughout the Union.

Members of this Association, vitally interested in the quality of wiremen, as well as all persons in the electrical industry, owe Mr. Clutterbuck a debt of gratitude for the splendid work he has accomplished. Fortunately the Board has not been deprived of his valuable services and wise advice by reason of the fact he has consented to serve as an ordinary member until the end of the year.

It has fallen to Mr. Smith to uphold the high traditions and principles established by Mr. Clutterbuck and to continue the good work initiated by him since the inception of the Electrical Wiremen and Contractors' Act of 1939.

Since the virtual completion of demobilisation and return of all public servants to their respective posts, it has been found possible for the Department to considerably strengthen the clerical section dealing with the activities of the Board. This means that applications are dealt with more expeditiously in addition to the disposing of arrears. A reference to the statistical tables attached to this report which will be published in the Proceedings will give members the position at the end of 1947.

(2) Meetings of Board

During 1947 meetings of the Board were held at three weekly intervals with a short recess over the Christmas-New Year period, making a total of 16 meetings for the year.

(3) Applications for Registration

During the year 625 applications for registration were received—a reduction of 96 on the previous year.

No of applicants registered, 501.

No. of applicants accepted for examination, 603.

No. of applicants refused, 78.

No. of applicants approved for full registration without examination, 133.

A total of 836 applications were dealt with during the year, the excess of 211 over the number of applications received for registration being accounted for by arrears brought forward from previous years.

Due to the efforts of the retiring Chairman, Mr. Clutterbuck, and the clerical assistants in the Department, all arrears were disposed of at the end of 1947 and enabled Mr. Smith to take office under favourable conditions.

Delays in future will only arise as a result of applicants not furnishing adequate information.

(4) Examinations

Two examinations were held at various centres in the Union during the year at which a total of 639 candidates were examined—56 per cent. of those who sat secured passes in one or more of the two papers.

At the practical examinations 362 candidates presented themselves and 299 passed, or 83 per cent. Whilst it has been suggested that, by reason of the high percentage of passes, the practical examination serves no useful purpose, it does, however, have the effect of excluding the incompetent person.

It is necessary to point out that the War Emergency Regulations, which enabled provisional registration to be extended beyond the period of 12 months laid down in the Act, has now been revoked and it is therefore necessary for candidates to make adequate preparation to ensure success in the examinations prior to the expiration of the provisional registration.

The Board has approved in principle of more frequent examinations being held in order to give applicants ample opportunities to secure the success within the provisional registration period of 12 months, and also to deal with the large number of applicants. The work involved is being organised and it is hoped, within the near future, to hold at least three written and 12 practical examinations per annum.

(5) Immigrants

The position regarding immigrants outlined in the report submitted last year has considerably improved. Whilst the number of electricians arriving in the Union from Overseas has not abated, the majority of those arriving at present are bringing the required documentary evidence of work undertaken, so that the Board is able to deal with the applications for registration with the minimum of delay.

(6) C.O.T.T. Trainees

It has been decided to eliminate the C.O.T.T. trade test and to accept these trainees for the examinations after 12 months' service with a reputable employer, provided such employer certifies that, in his opinion, the trainee has acquired the requisite knowledge, skill and experience. Upon success at the Board's examinations, the trainees become entitled to full registration. This is considered to be the fairest method of dealing with this matter, particularly with regard to those applicants of mature age who deserve exceptional treatment.

(7) Determination of Areas

Last year it was reported that a comprehensive list of additional areas had been recommended to the Minister for determination. However, the list was considered to be too extensive, and a revised list was submitted which is now under consideration.

(8) Registration of Contractors

Item 7 (iii) on the Agenda, Registration of Electrical Wiring Contractors. A circular has been issued to all Suppliers, Contractors and Trade Unions pointing out the advisability of contractors being registered on lines similar to that of wiremen. A unanimous response has been received from the parties concerned with the result that the requested recommendation has been submitted by the Board to the Deparment of Labour. As this involves new legislation, the Department of Labour has requested the Board to submit further information and this matter is under consideration.

(9) Conclusion

The thanks of the Board are due to the examiners for the manner in which they have performed their onerous duties. The nominal fees paid to these gentlemen are insufficient recompense for the zeal

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and enthusiasm with which the duties are carried out, without which the Board would not be able to function.

Thanks are also due to the clerical division of the Department for their loyal support and assistance which enabled the Board to perform the duties entrusted to it under the Act.

Finally, may I be permitted to express my appreciation to the Chairman of the Board for the facts forwarded me upon which it has been possible to frame this report.

Mr. President, Ladies and Gentlemen, we have with us this morning Mr. H. O. Smith, our new Chief Inspector of Factories, and I am sure in asking you to accept this report you will give him an opportunity to address the Convention.

PRESIDENT:

Thank you Mr. Fraser for your very interesting report on those two subjects.

I think I am voicing the feelings of the Executive of this Association when I say how deeply grateful we are to Mr. Clutterbuck for the work he has done on the Board and his assistance with the amendments we have tried to get through, viz., amendments to the Electrical Wiremen's Act to embrace the licensing of Electrical Contractors by the Government. Our relations with Mr. Clutterbuck have been very happy and I am sure our happy relations with the Department of Labour will be just the same in so far as Mr. Smith is concerned.

Our thanks also are due to the Examination Board, because by that Board passing these candidates they have helped us as Electrical Engineers to administer the Wiremen's Act.

I will now ask Mr. Smith if he has anything further to add to Mr. Fraser's report, and I would be very pleased if he would address the Convention.

Mr. H. O. SMITH, Chief Inspector of Factories:

Mr. President, Ladies and Gentlemen, I would like to add a few explanatory remarks to Mr. Fraser's report, but before doing so I feel it is my duty to express to your President and to the Executive Council my thanks for continuing the tradition of inviting the Chief Inspector of Factories to these Conventions. I think that the presence of that official at Conventions such as this is most essential, because the personal contact which it brings about enables the members not only to get to know the man who holds that position but may, at a future date, facilitate any official relationship. It is always of great assistance on both sides for the official to know the man he has to deal with and for the man to know the official, particularly in my case because I feel that the successful administration of the Factories Act and the application of the Machinery Regulations are only possible by co-operation between the two. Fortunately, my predecessors, Mr. Clutterbuck and Mr. Joubert, have been able to establish that tradition of co-operation which is so welcome to the Department and probably also to the members. Well I assure you that I will do everything in my power to uphold that tradition and give you all the co-operation I possibly can, and naturally expect you to reciprocate and give me the co-operation that I expect from you.

Mr. President, for these reasons I want to thank you for your invitation to me to be present at this Convention and in your opening remarks, for referring to me as one of the visitors who is particularly welcome: these remarks, Mr. President, are very highly appreciated. You also referred to my predecessor, Mr. Joubert, and I can assure you that the kind words you spoke about him were very much appreciated by me and I will certainly convey them to him next time I see him.

I now come to Mr. Fraser's Report on the Wiremen's Registration Board. I am attending this Convention, gentlemen, in a dual capacity, i.e., as Chief Inspector of Factories and as Chairman of the Wiremen's Registration Board, and I can't refer to the Wireman's Board without adding my tribute to the splendid work done by Mr. Clutterbuck. Mr. Clutterbuck, as you all know, was for

years my Chief and instinctively I owe him that loyalty I automatically gave him when he was my Chief, and it is gratifying to me to be able this morning to express that loyalty by paying him a tribute for the excellent work he has done on the Board, and I assure you I will do everything in my powerto uphold the tradition he has established on that Board and to continue the good work which he started and carried on for a period of eight years. I would also at the same time like to thank the other members of the Board for the way they have supported me since I took over the Chairmanship, particularly Mr. Fraser, who has been a tower of strength to me in the successful operation of the Board and carrying on in the way it has done in the past. Naturally, you can understand that to begin with I needed a lot of guidance, as I had only had three months' experience on the Board before I took over the Chair, and problems crop up almost at every meeting on which I have to ask for information, and both Mr. Clutterbuck and Mr. Fraser have been very helpful to me and supported me 100 per cent., for which I would like to record my thanks at this meeting.

Now, coming to details of the Wiremen's Board; I think one should refer to a certain amount of discontent and complaints that existed in the past, in that applications were unduly delayed. In his report last year, Mr. Clutterbuck referred to that and explained to the Convention the reasons therefor. Mr. Fraser has explained to you that the Department has now been able to reorganise and, due to Mr. Clutterbuck's efforts and the Department's assistance, during 1947 all these arrears were dealt with. All applications that come in now are dealt with expeditiously and if anybody should still feel that there is reason for complaint, I am quite sure that if these complaints were voiced, or brought to the notice of the Board, an explanation would be given. Our experience at present is that the only delays, as Mr. Fraser explained in his Report, are due to applicants not providing the Board with all the information necessary to enable them to arrive at a decision. What is not generally understood is, that whilst a man may be a perfectly good electrician, the Board does not deal with "electricians" as such, but only deal with "wiremen," and it is essential in issuing a testimonial to an applicant for a wireman's licence that his actual experience in wiring work be referred to. Again and again we have to refer an application back because a man has omitted to state what actual wiring work he has done. I am sure that many of these electricians get references from you gentlemen, and if in future you will take the precaution to satisfy yourselves as to the wiring work done by that man, it will accelerate the work of the Board considerably. We look to you gentlemen for your assistance.

I think one should also pacify men who have failed and complain that they have not had a square deal. I can assure you gentlemen that the examiners—I have been round the various centres and I have got to know most of the Examiners personally—are all disinterested persons who will give the candidates every possible fair deal. I have actually attended practical examinations myself and I have seen how these examiners deal with the candidates, and any wireman who knows his job cannot help passing. It is only the man who has somehow slipped in, and should not, who then reveals his lack of knowledge of wiring and who will be failed. As I am talking about examinations I would like to mention that, the examiners tell me, particularly on the written exam, that candidates present themselves who have been electricians for years and feel that they know their job and do not properly prepare themselves for the exam. I don't care how well versed a man is in his subject, if he has to pass an exam in it he is foolish not to revise and prepare himself for the exam.

I, therefore, again appeal to you for your assistance in that you advise any of your men who have been accepted for examination to prepare themselves for the exam. properly, and of course the best preparation would be to attend a proper

course. In connection with that, they should also be told—I think Mr. Clutterbuck referred to that in his Report last year, and I repeat it again—that any man who has passed the N.T.C. II in electric wiring with a percentage of 50 per cent. or more on the syllabus since 1945, will be exempt from the written examination of the Board. You should, therefore, advise them, especially your apprentices, to pass that examination, which will exempt them from the written examination of the Wiremen's Board.

Coming to the practical exam, those men who have passed their exam and who have been employed by a contractor or an employer of repute, if the Board is satisfied that such men have had a thorough training in electric wiring it will even exempt them from the practical exam. It is, therefore, essential that you should build up a reputation and tell your contractors that they should build up a reputation for training their apprentices well, because well-trained men, if the Board has evidence of good training and experience, will be exempted from the practical exam as well.

In dealing with immigrants, the position as Mr. Fraser explained, has clarified itself considerably. The Board has taken the precaution to notify all the Immigration Selecting Committees overseas, that when it comes to electricians they will require registration as wiremen, and that they must therefore bring sufficient evidence with them on wiring work so that the Board can deal with them, and as a result of that, applications from immigrants are reaching the Board much more satisfactorily and we are now able to deal with their applications far more expeditiously. There are, of course, still exceptions, where men in their applications submit their electrical experience, ignoring wiring, and the Board is unable to deal with them. Apart from that, immigrants still present problems to the Board, especially men who have been released from the Navy, but these cases are all dealt with on their merits and I don't think that we will have any reason for complaint in that respect in future.

Well gentlemen, that is all I have to say on the Wiremen's Board, except that the statistics referred to by Mr. Fraser are really quite revealing and, with your permission, Sir, I would like to make a few remarks on the totals, unless you feel I am occupying too much of your valuable time?

PRESIDENT:

I think the Convention would like to have a brief resumé on your statistics.

Mr. SMITH:

Thank you Sir. These statistics reveal that by the end of 1947 the Board had received 5,300 applications for registration and it will interest you to know that 500 odd, that is about 10 per cent. only, have been refused altogether. Every now and then we get an application from a man who is chancing his arm, if you will allow me to use some unparliamentary language. The Board is aware of that: they have means of finding out these things and those men are flatly refused. A 10 per cent. rejection is rather low and should be a credit to the Board, in that they give every man who has the slightest reason, a sporting chance to sit the examination anyway. The total number of wiremen registered at present is 3,153. Of this total, 2,000 odd were accepted for the exam. That means only 1,000 odd were registered without examination., the Board being satisfied that they were fully qualified. A great percentage of these registrations, of course, were made in the early days of the Act, when within a certain time limit every man who had held a local licence was entitled to registration. Unfortunately, many of the men had already joined the forces and were unable to take advantage of that, and in 1940 700 men were registered without examination; the others were in the succeeding years.

Coming to examinations, we find that of the 14 written examinations held, altogether 2,283 candidates were examined, and I think I would be in order here, Sir, if I added my tribute to Mr. Fraser's

remarks regarding examiners. These examiners are mostly teachers at our Technical Colleges, teachers of electric wiring, and here again one must pay tribute to Mr. Clutterbuck in that he organised the whole thing. He went round the country and visited these men; most of these men, in fact every one of them, does this work for the love of it and it should be put on record that a debt of gratitude is due to them, because I feel that the fees they receive for these examinations are by no means adequate recompense for the conscientious work they put in in examining candidates, and by upholding the standard laid down by the Board. You can thus be assured that any man who has passed this examination is up to minimum high standard and that that standard is the same throughout the Union.

In the 14 exams held, 2,000 odd persons were examined, of which 1,458 passed; that means a failure on the written exam of an average of 40 per cent., so you can see there that there is a considerable weeding-out process. Of course once a man has failed he is entitled to write again as often as he likes. We have had men write as many as seven times and still fail, and I think it is only fair to tell you, to illustrate the fairness of the Board, what action they then proceed to take. If a man has failed repeatedly and is of good repute, and is a competent and experienced wireman but happens to have the examination complex, or perhaps his education is not as high as it might be in order to take a written exam, he is given a final chance, in that he is submitted to an oral exam, and quite recently we had a very fair illustration of what happens in that respect. Three men who had failed repeatedly were subjected to an oral examination, which they passed with flying colours. They were men of good repute and they knew their job: it was felt that it was unfair to deprive them of their living and I think the final result justified the Board's action. Referring back to the practical examination, it has been felt that as there is only a 10 per cent. failure with the practical examination it is not of much use, but on the other hand, as I told you, I attended several of these practical examinations and they are, to my mind, very useful, in that they weed out that 10 per cent. who are not fit to receive a licence until they have improved their practical knowledge and skill; consequently, the Board's policy will be to continue this practical examination.

Well Mr. President, ladies and gentlemen, that is all I have to say except that I would like you to know that I will attend this Convention throughout and should any subjects crop up in connection with the Factories Act or with the Machinery Regulations and I feel I can help and give you information, I shall be only too glad to do so if I can. Thank you very much.

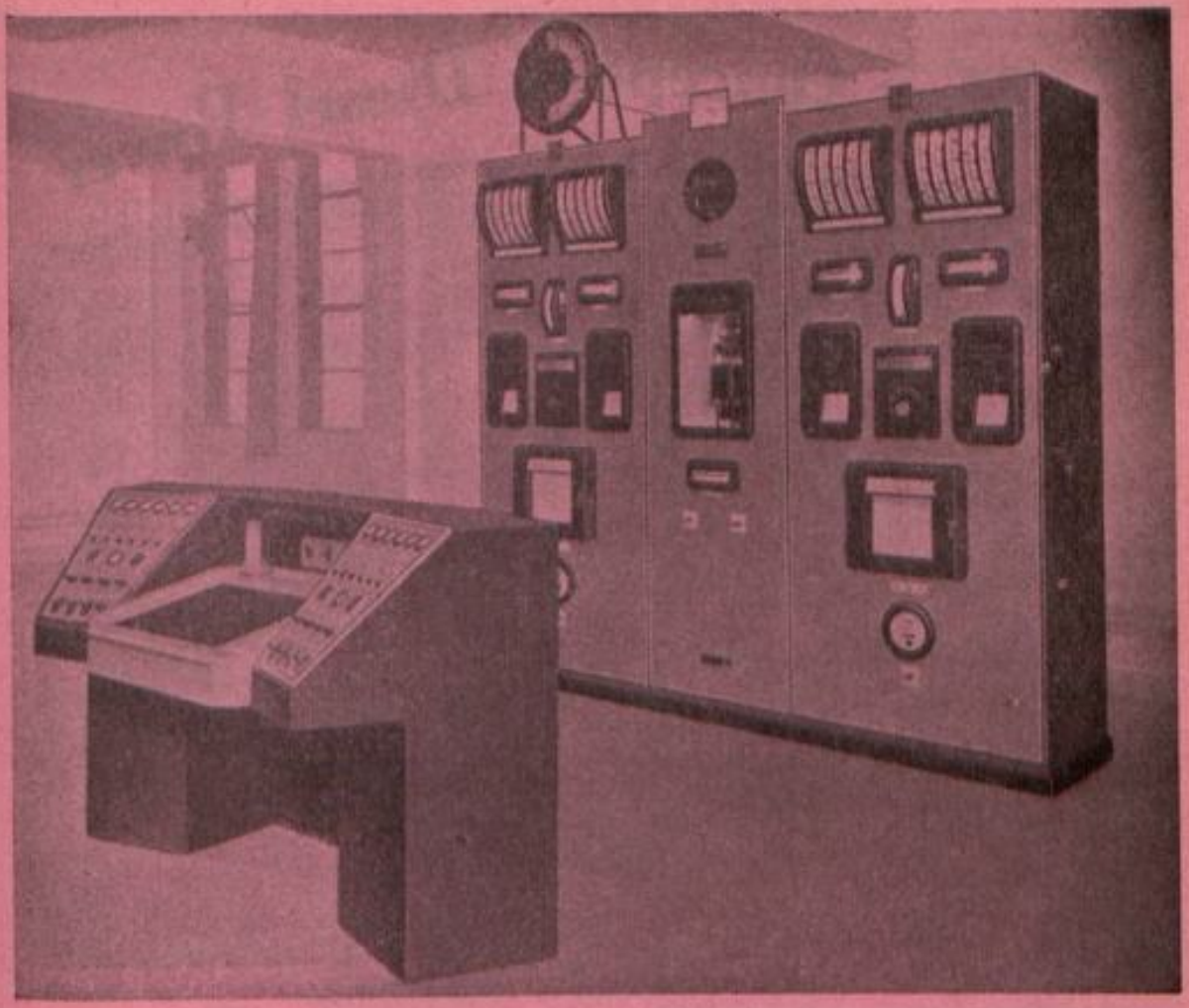
PRESIDENT:

Thank you, Mr. Smith, for your very illuminating address to the Convention. I am sure you have cleared up many points on which members have expressed apprehension and cleared the air a good deal with your remarks. It is very nice to hear your assurance which, I think, was quite unnecessary because it is understood, of working in co-operation with the Association and I am voicing the feelings of this Convention I am sure when I say how much I appreciate it.

Reverting to Mr. Clutterbuck, I am very pleased that his association with this Association is not going to be severed. I don't know whether Mr. Clutterbuck would care to make any remarks at this stage before I throw this matter open to the Convention on the two items now put before you.

Mr. CLUTTERBUCK:

Well, Mr. President, I have nothing to say except that I thank you for the very complimentary remarks you have made in connection with my work on the Electrical Wiremen's Registration Board. I have not lost complete touch with it as I am still a member for a while, and am endeavouring to give our present Chairman all the support possible and will do



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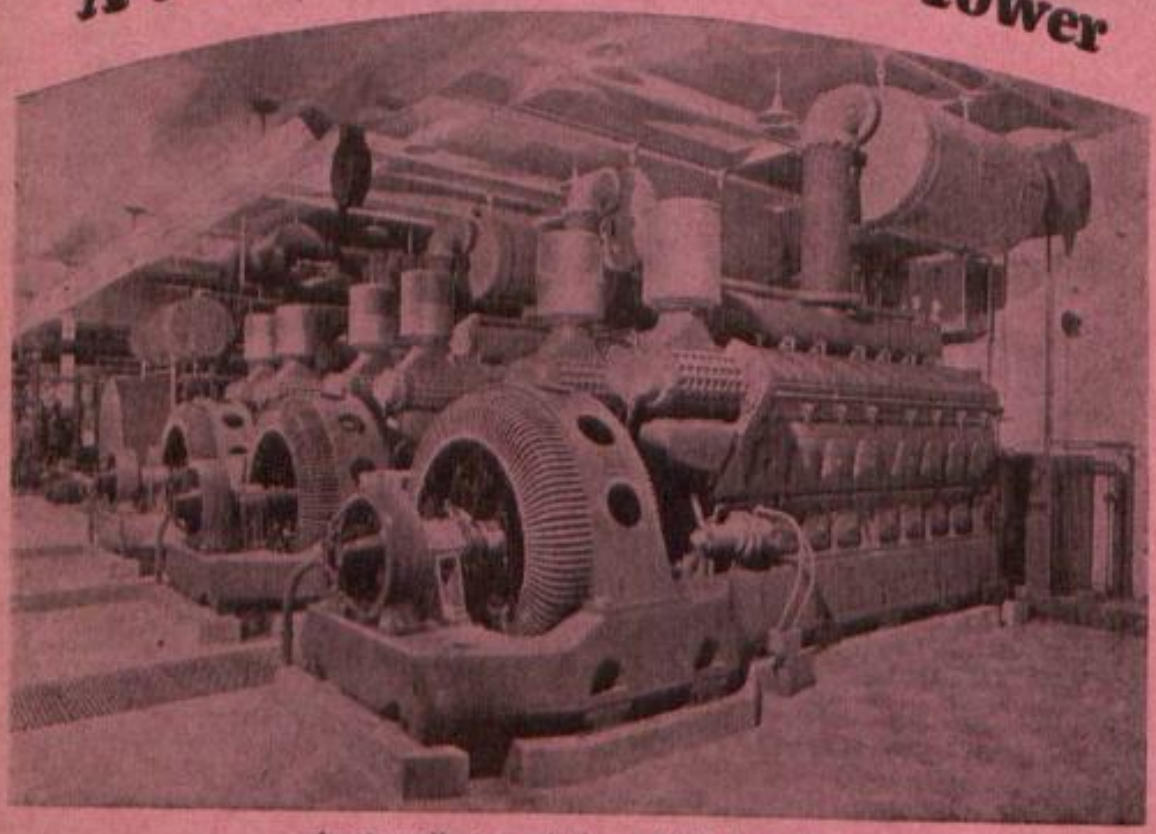

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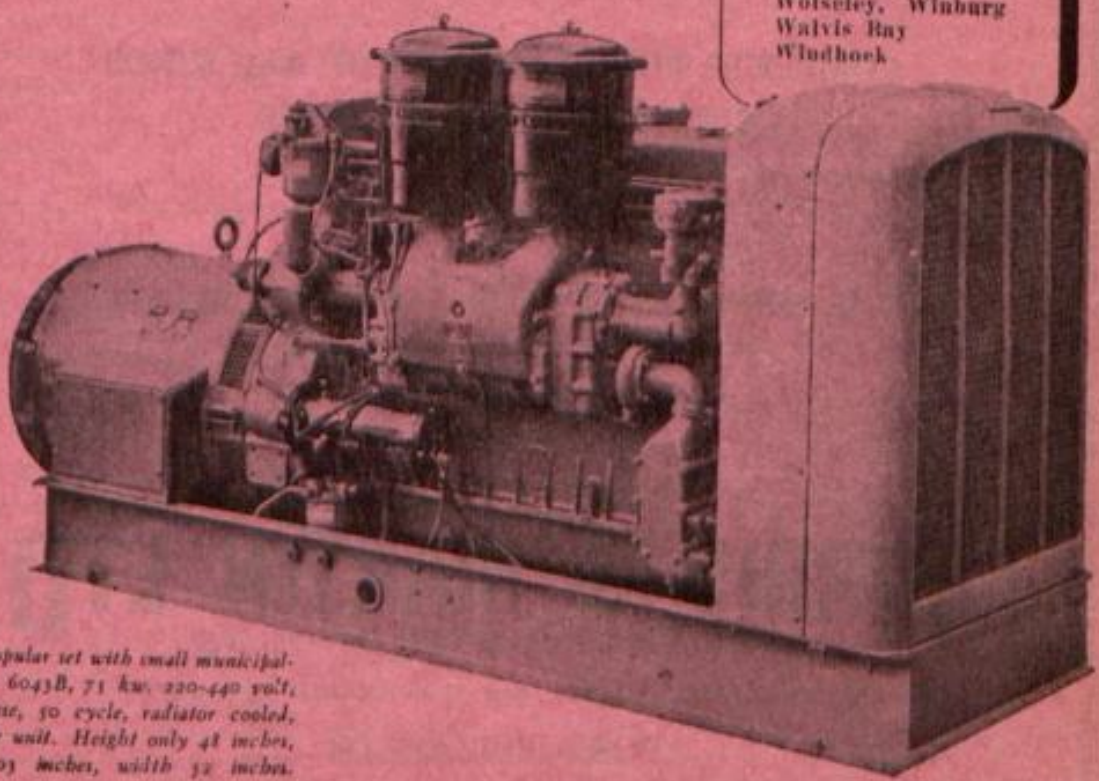

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my best to further the interests of both the Association and the employers and wiremen themselves while on that Board.

PRESIDENT:

Thank you Mr. Clutterbuck. Are there any members who wish to make any comment on Mr. Smith's remarks before we adjourn? I propose we adjourn at a quarter to eleven for tea and then a paper by Mr. Andrew will be given.

Mr. MULLER, Bloemfontein:

Mr. President, I would like to ask Mr. Smith what the arrangement is regarding the issue of temporary licences. We still have difficulty with some die-hards who can't get through these examinations and so far as I know, none of them has been issued with temporary licences. It is rather difficult to administer the Act without depriving these people of a livelihood if they are without a licence. While the examination is pending at what stage is a temporary licence given?

Mr. SMITH:

Would you like me to reply to that right away, Sir?

PRESIDENT:

Yes please.

Mr. SMITH:

Well then, you must not forget that the primary object of the Act is the protection and safety of the public. We get an application and the man is not 100 per cent. qualified in the opinion of the Board. The Board decides to submit him to the Examiner. When it has been decided that he can sit for the examination, the question of provisional registration crops up, and I will assure you, Mr. Muller, if I may address him through you Sir, that a man's livelihood is the Board's first consideration. It considers whether he needs a temporary licence to carry on his livelihood; if he does not then of course it does not matter. He may be working in an undeclared area or be employed by a Municipality where he does not need a licence, and in that case the decision is not very important. If on the other hand he is working with a contractor in a declared area and his livelihood depends on it, I can assue you the Board will give him a provisional registration, provided it is satisfied that it is safe to do so in the interests of the public. If on the other hand the evidence before the Board is too meagre to satisfy it that the man is safe, then the provisional registration is refused until he can produce more evidence on his experience of wiring work, but as a rule provisional registration is issued at the time when the man is accepted for examination. Does that answer your question, Sir?

Mr. MULLER:

Does it automatically follow or does he specifically have to ask?

Mr. SMITH:

Yes, he has to ask for it, because if he does not he won't get it, but as a rule when he has been notified that he is accepted for examination he is told that if he needs provisional registration he must apply and then his case is again considered as to whether or not he deserves to be granted provisional registration.

PRESIDENT:

Thank you, Mr. Smith. Are there any further questions any member would care to put to Mr. Smith, because the opportunity for discussion helps to clear the air for all of us?

Mr. THERON, Worcester:

I would like to know from Mr. Smith whether that provisional registration would apply in unregistered areas as well? The second point is the question of determination of new areas. Mr. Fraser mentioned this but no further mention was made. My Council is particularly interested in the determination of new areas and I would like to know

when the Board considers this determination can take place.

Mr. SMITH:

Mr. President, I want to make sure I understood the question correctly. The first question was, are provisional registrations issued for undeclared areas? The answer is if a man applies for it and he is deemed worthy of it, he will get it whether he is in an undeclared area or not, but as a rule if his application is before the Board and he is known to be working in an undeclared area, his provisional registration is not considered unless he applies for it. The second question was when will further areas be declared? I think Mr. Fraser's explanation there is all I can give you, Sir. The original list submitted to the Minister, as he says in his report, was considered too extensive to begin with and it was sent back to the Board for reconsideration. It was cut down considerably and then submitted to the Minister again and it is still under consideration by him. I am unfortunately unable to give this Convention any idea when new areas will be declared. One must bear in mind that at present we are in a state of flux, in that there is an election pending and it is almost certain that nothing will be done until after the election.

Mr. FERREIRA, Zastron:

Some applicants were exempt from examinations. In the case of registered men being unfit, is there any procedure by which such men could be disqualified?

Mr. SMITH:

Mr. President, the question is, if a man is registered and proves to be unfit to hold his registration, what steps can be taken to disqualify him? The answer is (Mr. Fraser, will you correct me please if I am wrong, or Mr. Clutterbuck) as far as I remember, if a man does unsatisfactory work and that is reported to the Board, the Board holds an enquiry into the case and if it is satisfied that the report is correct and that the man is not a fit and proper person to hold a certificate, the Board has the power to cancel that certificate. Is that right, Sir?

Mr. EASTMAN:

Yes.

Mr. SMITH:

And I might add, Sir, if I may, that it rests with you gentlemen, who have your installation inspectors who are finally responsible for the quality of the work that is turned out to make such reports to the Board. You should tell your installation inspectors that if they do find a man who consistently turns out shoddy work to report this to you. It is your duty to protect the public and you should take steps to have his certificate cancelled by the Board.

PRESIDENT:

I have had a request from Mr. Andrew with regard to domestic appliances mechanics. I shall ask Mr. Fraser to answer Mr. Andrew's question. Will you raise the point Mr. Andrew please?

Mr. W. M. ANDREW, King William's Town:

Thank you Mr. President. Before coming to that particular item, I would like to refer to another matter. It occurs to me that the Wiremen's Board may have foreseen difficulties in connection with the training of Native wiremen and if they have, what machinery or procedure have they set up to deal with this contentious problem. I refer to the Vocational Training Scheme near King William's Town which is now due to be opened for the training of Native wiremen.

This training scheme is being set up for the purpose of training Natives over a period of six to nine months, to do repetition two wire wiring work in houses now being erected by Natives, for occupation by Natives in a large Native Township. The King William's Town area at the moment is undeclared.

This wiring work will go on for the next five years or possibly ten, while the Township is being completed. It is important to us in King William's Town to be defined a declared area as soon as possible, but this Native Township's boundary and the King William's Town commonage boundary are common to one another.

I am anxious, and I am sure other members will be just as anxious to know, what influence, if any, such conditions will have on declaring an area in terms of the Act.

PRESIDENT:

I know the district to which Mr. Andrew refers and it is a very important matter.

Mr. SMITH:

Well gentlemen, I think we must put our cards on the table. The first thing I should tell you and which you all most probably know is that in all our industrial legislation, there is no colour bar as such. The only Act I know of where there is a colour bar is the Mines and Works Act and there it required a special amendment of Parliament in 1926, but neither in the Factories Act, the Machinery Regulations nor in the Wiremen's Act is there a colour bar. Therefore, when Natives are trained the fact that they are Natives has no reference to the Act. We must regard the problem from a practical point of view and that is this. The Department in its wisdom has decided that the training of Natives for Native housing only is essential and necessary because of the shortage and high cost of skilled men, and when it comes to applying this decision, and these men are put on the job of wiring houses, the way I look at it is this, that the safety of these installations will depend on the supplier. The supplier then cannot connect unless he has tested that installation and is satisfied that it is safe and according to his regulations. The fact that this work is being done by Natives has no relationship to the Wiremen's Act and as to what action you take there, gentlemen, I am afraid I cannot guide you, but legally the position is this, you are not concerned in an undeclared area with who does the work, but you are concerned with whom you supply, and under the Machinery Regulations we look to you to guard the safety of the public. I would like to make the position quite clear to all of you that under the Machinery Regulations the Government only deals with electric installations, generation and distribution as far as the service line. From the service line it is left to the local authority, that is you gentlemen. That means that wiring of domestic appliances and the wiring of a house is not "machinery," in terms of the Factories Act. It only becomes machinery when there has been an accident. You look up the definition of machinery in the Factories Act and you will find that it is so. Therefore if you don't want wiring to be "machinery," do everything you can to avoid accidents, and to avoid accidents don't connect up any wiring that you are not satisfied with. That should be your attitude. The Government has handed over to local authorities the administration of the safety of domestic wiring. You Engineer Members are the technical advisers to your local authorities, and it is your duty to say whether that wiring is safe or not.

Mr. ANDREW:

Thank you Mr. Smith, but I think the important thing which should be answered is; what is the position in regard to the declaring of the King William's Town area, bearing in mind that, immediately adjacent to King William's Town, we will have Natives with very limited training doing wiring work? And still more important, can you tell me and the members whether, on this account, the declaring of King William's Town area will be held up?

Mr. SMITH:

I am unable to predict the Minister's decision. The public will be considered if it should occur.

Mr. MILTON, Electricity Supply Commission:

The district to which Mr. Andrew has just referred is a district which comes under the jurisdiction of the Electricity Commission. In all the Commission's areas of supply it is a condition that installations shall comply with the Wiring Regulations of the Institute of Electrical Engineers, which is tantamount to the Wiring Regulations adopted by the majority of municipalities.

With regard to the possibility of holding up of the "determination" of that area, I understand that the Department of Native Affairs desires to train Natives in special areas, such as Zwelitsha for example, as wiremen and artisans for employment in their own towns. This particular town will have a population of probably eight to ten thousand people. It seems to me that the determination of the area of King William's Town should not be held up because wiring work is likely to be done in a part of that area by Natives. I presume adequate steps might be taken to restrict their employment to the Native Townships.

Mr. SMITH:

We are touching on a very delicate subject, and when it comes to endorsing certificates, under the Act the Wireman's Board is able to endorse provisional registrations, in other words, lay down certain conditions on the certificate only as regards provisional registrations. When it comes to plenary registrations—full certificates—the Board has no power to lay down conditions, and should it come up within the near future that King William's Town should be a declared area, I am sure that some compromise or some means of adjusting the position will be arrived at.

But I would like to pacify members altogether on that. They should not disturb themselves unduly in this respect—that Natives will become fully registered wiremen. The Government is perfectly well aware of the position; they have assumed the responsibility of introducing the Wiremen's Act for the safety of the public and that safety will always be borne in mind and given full consideration. I feel confident that means will be devised to arrive at a satisfactory solution.

PRESIDENT:

Well gentlemen, we will now adjourn for refreshment. Congress adjourned at 10.45 a.m., and resumed at 11.15 a.m.

PRESIDENT:

I will now call upon Mr. Andrew to give his paper entitled "Some Observations and Notes on Supply to Rural Areas."

Mr. W. M. ANDREW, King William's Town:

SOME OBSERVATIONS AND NOTES ON SUPPLY TO RURAL AREAS

by

W. M. ANDREW,
A.M.I.E.E., A.M.I.Cert.E., A.M.I.(S.A.)E.E.
Technical Assistant, Electricity Supply Commission (Border Undertaking) King William's Town.
Formerley Borough Electrical Engineer, King William's Town.

Mr. President and Gentlemen,

The passing of the Electricity Act in South Africa in 1922 gave electricity many previous difficulties, especially as regards financing, and gave impetus to the development of economic and payable velopment of economic and payable schemes. While immediate benefits were felt in those areas where electricity supplies were already established, there is no doubt that rural supply developed as a result of this Act quicker than would have otherwise been the case.

The war years, and the difficult supply position which will continue for several years yet, has accumulated a "back log" of work for the industry, which, taken with the rapid development of industry planned, and in the process of being planned, is a guarantee, if one is needed, that for many years to come, everyone connected with the generation and supply of electricity will be fully engaged.

The demand for amenities and productive assistance in the hinterland has probably contributed to the recent amendment of the Electricity Act, which permits the Minister, after an investigation has been made, to decide whether a projected regional or area scheme may, in the national interests, be subsidised, or assisted financially, presumably with the view to assist in an increase of the country's productive activity.

It may not be out of place to first indicate the broad lines upon which the electrification of truly rural areas should proceed.

The minimum costs of transmission and distribution, from bulk supply points, are attained by the liberal use of overhead lines and by the adoption of standardised voltages and equipment, and a carefully planned layout of the area as a whole.

The construction of transmission and distribution systems should, as far as possible, anticipate the demands so as to foster rapid development instead of providing supplies in the area by sporadic and irregular extensions, as and when, the demand arises.

The adoption of standard voltages and the simplification and standardisation of equipment, such as overhead lines, transformers and switchgear, produce considerable savings in capital cost. Post-war costs have risen to such proportions that schemes planned before the war can no longer be carried out, and in some cases will have to wait several years. This large increase in capital costs, the full impact of which has not yet been felt by either the suppliers or users of electricity, demands the careful and continuous attention of responsible engineers, otherwise considerable adverse criticism will result when tariffs are, by force of these circumstances, increased. In other words, the pre-war halfpenny per unit might well prove to be a "delayed action" post-war penny per unit.

Again, on account of the relatively small number of units consumed per head of population in rural areas, and the correspondingly low revenue obtained, low capital costs are of prior importance. This is perhaps more so with the electricity supplies in rural areas than in the case of any other type of electricity supply, for the relatively lesser value of this kind of load to an established supply system is such that, unless an adequate return on capital outlay can reasonably be assured within three or four years from the date of commencement of supply, the scheme will not be undertaken.

Savings in capital cost, however, must not be such as to sacrifice safety, or to prejudice within a few years of the completion of this scheme its reliability of supply. In other words, rural schemes should be sturdy, simple in construction, using established methods and proved materials, and at all times be capable of extension.

CHARACTERISTICS OF RURAL AREAS

The demand for electricity in rural areas or for agricultural regions is broadly dependent upon the extent, habits and occupation of the population, while the practicability of meeting any such demand on a commercially payable basis is affected by the average density and wealth of the population.

The development attained in any scheme will be influenced to an important extent by the existence or absence of such factors as the offer of attractive tariffs designed to encourage the fullest use of electricity without restriction; the offer of facilities in the way of schemes of assisted wiring and of hire and hire purchase of apparatus; and the provision of an efficient maintenance and consumer service.

The nature of the present demand for electricity by rural communities and farms is of the same general character as that obtaining in urban areas, viz., for lighting, heating and cooking, and power purposes. The general difference is in the purpose for which electric power is applied, particularly in connection with farming operations. No distinctive applications of electricity pertaining only

to rural or agricultural operations have been adopted in any general way, but large scope exists in certain backward areas for applications of electricity in connection with farming.

When reasonable full use can be made of electricity on farms, it is probable, as a conservative estimate, that individual farms up to 300 acres in extent would average a variation of from 4,000 to 20,000 units per annum.

Owing generally to the sparse rural population in South Africa, usually ribbon-developed along railways, roads or rivers, it invariably happens that until some large consumer or town receives supply, the surrounding and intervening rural area would not be served. On this account the large isolated consumer is invaluable in initiating a supply to a given area.

The diversity of individual farm loads is of special interest and is an important factor in the economy of the system; any development must be considered with a view to the effect on the maximum demand of the system as well as to efficiency. Table I illustrates two mixed dairy and agricultural farms in this area. In the case of Farm "A" no additional plant has been installed since the initial three-phase supply was connected some 15 years ago. But in the case of Farm "B" a steadily increased installed capacity has been in demand since the single-phase supply was first available in 1946.

TABLE I — CONNECTED LOAD

	Lts.	H. & C.	Power	Sterilising	W/Heating	Total
Farm "A"	1. 5 kw.	10. 6 kw.	38 h.p.	—	.5 kw.	50.6 k.v.a.
Farm "B"	3.25 kw.	17.45 kw.	3 h.p.	4.5 kw.	1.5 kw.	29.7 k.v.a.

To complete an analysis of these two cases we have:—

TABLE II

	FARM "A" 3-Phase 4 Wire Supply	FARM "B" Single-Phase Supply
Area in Acres	105	40
Total Installed K.V.A.	50.6	29.7
Maximum Demand K.V.A.	32*	11.5
Transformer Capacity K.V.A.	50	15
Average Units per annum	43,800	23,400
Average Revenue per annum	£120/17/0	£106/7/0
Load Factor (Annual)	15.8%	23.2%
Distance from Built-up Reticulation System	1.5 miles	2.25 miles

*Occurs on overnight pumping supplied at reduced Tariff Rates.

Bearing in mind that, in the cases under consideration, each consumer would receive supply from a local step-down transformer, a knowledge of the habits of the rural consumer is essential in order to arrive at a suitable diversity factor, and thus be able to confidently select the most suitable and economical transformer size. Under average conditions, and where supply is used for all purposes, it would be safe to use a factor of 2.5 to determine the consumer's probable maximum demand, and in selecting the rating of the transformer for a particular consumer, the use of such a diversity factor

should have regard to the duty cycle which the transformer has to meet. This knowledge will enable the maximum use of overload capacity to be made, thus effecting a saving in transformer cost and losses without sacrificing reliability of service.

GENERAL CONSIDERATIONS IN A PROJECTED SCHEME

The general design or lay-out must have due regard, and give proper weight, to the many requirements and conditions to be met, the principal of which may be summarised as follows:—

(a) The financial aspects of electricity supply. Here it may be added that the supply industry continues to afford a sound investment; a fact which every municipality makes use of, even in some cases to the extent of financially crippling their trading departments.

(b) The requirements of and the limitations set by the principal Statutes, relating generally to electricity supply, and particularly to the licence under which the work is carried out.

(c) Statutory regulations, relating, amongst other subjects, to the safety of the public system of supply, construction of overhead lines, regulation of pressure at consumers' terminals and other matters.

(d) The extent and the physical character of the area for which powers are being sought or have been granted; the availability and cost of wayleaves, the distribution of population, the number of settlements and isolated farms, residences or institutions, etc.; and the service, if any, that may be given to other public utilities.

(e) The demand for electricity and the revenue to be expected in both the earlier and the later stages of development, covering, say, a period of six years; the estimates prepared in this connection being based as far as possible on an actual canvass or past experience in other areas, etc.

(f) The classes of material and plant available for use and adaptable for the purpose selected, to give a minimum capital expenditure.

It is generally recognised that unless some other circumstance, such as the assistance offered by a large consumer contracting for supply in the initial stages of a projected scheme, a short period of unremunerative working is likely to be experienced in the early stages, and if this is accepted by the supply authority concerned, the rapid growth of connected consumers may be given considerable impetus by:—

(a) The adoption of a suitable scheme of assisted wiring, so that consumers are not faced with the difficulty, in certain cases, of making a large cash payment for outlay in wiring, etc.

(b) The establishment of a hire, or preferably a hire purchase scheme, whereby electrical appliances and motors may be purchased.

A consumer service of this type depends a great deal on the personality, enthusiasm, and ability of the engineer operating the system; it gives selected staff the opportunities to visualise the consumer and his vagaries and idiosyncrasies, and to use such knowledge to further the rapid development of a scheme from the initial unremunerative stage, to an early payability. Early development by rapid connection of available consumers will naturally result in a corresponding reduction of initial tariffs. In regard to whether or not it is the policy of the Undertaking concerned to provide a service for consumers' installations and apparatus, it may be that there does not exist a sufficiently well-equipped and organised private concern to provide for consumers' requirements. In such cases the policy of the supply authority should, in the interests of progressive development, be determined by the conditions obtaining in any given area.

In short, it is the consumer who provides the revenue upon which the success of a scheme depends, and this being so he is the person to be kept under continuous observation. Active competition between supply authorities and private companies is not advocated; for in any case it would not be long before progressive private enterprise entered the area, and in doing so should be given maximum support by the supply authority, who, knowing the degree of saturation attained by its own efforts, may withdraw from such work, after having established an invaluable consumer knowledge.

NOTES ON SOME APPARATUS AND MATERIALS

As stated previously, the liberal use of overhead lines is essential for truly rural supplies to be made available. The following remarks are, therefore, limited to some apparatus and material used on overhead lines:—

(a) Poles

Except for poles carrying 3-phase transformers above 25 K.V.A., single-phase transformers above 35 K.V.A., and pole structures which have to carry more or less elaborate arrangements of switching-gear, secondary transmission poles for rural supplies are usually of the single member type.

On the assumption that the conductor size will not be greater than .05 sq. ins., there is ample evidence to show that the treated wood pole should receive, without prejudice, serious consideration.

The average treated wood pole costs about one-third to one-sixth that of a concrete or steel pole of the same length, and, although this does not mean a corresponding saving for every line erected, there is little doubt that the use of wooden poles has made it possible for numerous small consumers in outlying districts to benefit. There are in the Union today some 80 municipalities that have made use of the treated wooden pole for transmission purposes. The requirements of good wooden poles are reasonable strength and taper, straightness and good seasoning qualities. Plantations established by the Department of Forestry consist almost entirely of Pines and Gums (Eucalyptus species). Of the Pines, Pinus Canariensis is reputed to be excelling in straightness of form and strength. Of the Gums, Eucalyptus Peniculata is one of the strongest pole timbers in the world.

A few of the principal pole species produced and used in South Africa are listed in Table III:—

TABLE III

Species	Province	Modulus of Rupture: lbs. per sq. inch
Eucalyptus Peniculata	Cape Midlands	12,200 to 21,800
Eucalyptus Peniculata	Natal	12,200 to 24,600
Eucalyptus Suligna	Eastern Cape	7,400 to 13,500
Eucalyptus Suligna	Transvaal	6,000 to 13,400
Pinus Canariensis	Western Cape	10,400 to 16,600
Pinus Insignis	Western Cape	8,800 to 17,000

The preservatives used in the treatment of wood poles in South Africa fall under two main headings:—

(a) The creosotes and other oily preparations, and

(b) The water soluble salts, such as zinc chloride and arsenious salts.

Except perhaps in isolated cases, creosote has proved its value in this country, and experiments carried out over long periods resulted in the development of a South African standard grade.

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Under average conditions the life of wood poles is said to be:—

(a) Creosote treated: 17 years and over.

(b) Metallic Salts: 6 to 15 years.

(c) Untreated: 2 to 7 years.

In Table III it will be noticed that, except for two instances, the values for modulus of rupture are all above 7,800, which is laid down in B.S.S. 1320 for all species of timber used overseas. This comparison would seem to quite clearly indicate that South African timbers are as strong as, if not stronger, than the nationally popular wood poles which are invariably used overseas for rural supplies.

Table IV indicates the maximum length of loading span that would be permissible on a few sizes of wood poles, if the pole strength were the only factor to be taken into account. It should also be noted that since failure occurs when the proportional limit of the material has been exceeded, the modulus of rupture can only be used to calculate approximate working strength.

TABLE IV

L—Overall length, Feet; L1—Lever arm length, Feet; W—Working load, lbs., with factor of safety 3.5; M—Modulus of Rupture.

L.	L1.	M.	W.	Maximum Wind Loading Spans, Feet	
				3 x .05 sq. in.	(3 x .05 sq. in. + 1 x .0225)
30	23½	12,000	874	738	626
35	28½	12,000	982	828	705
30	23½	7,800	568	478	407
35	28½	7,800	640	540	460

As the maximum pole length readily available in South Africa would appear to be 35 feet, it is evident that considerations other than pole strength will govern span length. On this account there is obviously some point in any particular case where the cost of erecting a wood pole line is as costly as erecting a steel or a ferro-concrete pole line, but such cases are not intended to be within the scope of this paper. It is, however, evident that spans of up to 400 feet may be used to serve truly rural areas where population is of a straggling, ribbon-like, and loosely-knit character.

Wooden poles have not the finished appearance of concrete or steel poles, and where, through inexperience, or other reasons, fittings are unsuitable or poorly arranged, the whole appearance of the line suffers; herein possibly lies the prejudice to the use of wood poles. The stability and neatness of fittings on wood poles can be easily maintained by use of suitable and readily available attachments.

(b) Transformers

In view of the load requirements, transformers for rural supplies require special consideration on the part of both the manufacturer and the buyer. It is unfortunate that the load factor on such transformers is often very low; it is not uncommon to meet cases where this is between 10 and 20 per cent., or even lower.

Inasmuch that overall economy of operation is of great importance, transformers for rural supplies are not vitally different from other power transformers, but because of the low load factors the question of relative importance to be attached to iron losses, copper losses, and regulation, requires careful consideration. The relative values of these three performance features naturally have a bearing upon reliability and initial capital cost, while the selection of any given transformer with respect to them is also affected by the rates at which energy, including losses, is priced.

In addition to these features, the load curves of transformers should be interpreted from a logical point of view. For instance, it is easy to conceive of two identical transformers operating on the same load factors where the actual duties imposed upon the two from the point of view of heating, which, after all, is the true criterion of transformer loading, are totally different. Thus, the true criterion of transformer rating is obtained from the particular duty cycle, but in practice the difficulty is in the fact that it is not possible to predetermine an actual load curve; it is possible, however, to anticipate and make use of overload ratings to economical advantage.

As the life of a transformer is that of its insulation, the deciding factor is the temperature to which the apparatus is subjected. Therefore, instead of purchasing transformers at the rating corresponding to the maximum load likely to be met, it would be more scientific, cheaper, and more economical to specify ratings based upon the K.V.A. load equivalent to the R.M.S. load, and to the probable duration of the maximum load.

Table V shows that with the same load factors and different duty cycles it is possible to select two sizes of transformers:—

TABLE V

Maximum Load	Average Load	R.M.S. Load
100	35	50
100	35	38

If the transformer was selected to have its rating corresponding to maximum load, then 100 K.V.A. size would be required, but if selection is made on R.M.S. load the rating need only be 50 or 38 K.V.A. respectively.

When the R.M.S. load is used for selection of rural transformers, particularly when in small single-phase sizes, a considerable saving in capital costs and losses is possible.

Bearing in mind that so long as a transformer remains excited the iron losses represent a steady loss of 100 per cent. load factor, it is not surprising that most purchasers of transformers for rural supplies lay great stress on the necessity of low iron loss, and that the manufacturers can produce these without entailing any sacrifice of reliability.

In Table I it will have been observed that in the case of Farm "B"— a self-supporting dairy farm — the maximum demand recorded is 11.5 K.V.A. and it follows that if the transformer could have at that time been obtained, the rating would have been specified as 5 K.V.A.

It is interesting to note in this case that, had a 3-phase supply been given, a reasonable balancing of the load across the 3-phases would have been impracticable, and consequently the transformer would possibly have been the same or a higher rating, and more expensive.

(c) Sub-Stations, Switchgear and Protection

A number of general arrangements of sub-stations have been divised and are in use. Every one of the sub-stations used for transforming on rural supplies have characteristics of their own. Bearing in mind that the keynote of sub-station design is simplicity, the isolating link, the fuse link, or drop-out fuse unit, with the transformer and low voltage gear, should be assembled with a view to safety and accessibility. The method of fixing the transformer should be such as to facilitate changing, and the whole assemblage should have a neat, workmanlike appearance, it should not look like an afterthought.

In order that portions of an inter-connecting ring may be isolated, it is essential to have a certain amount of switchgear.

In rural layout, the liberal use of isolating links and drop-out fuses graded to obtain the necessary discrimination, and backed up by oil circuit breakers of the pole-mounted type having reclosing features, would generally fulfil the majority of switchgear requirements and protective features of a rural layout.

The use and correct placing of lightning arresters is essential to keep disturbances and outages to a minimum.

Transforming points will vary from 5 K.V.A. up to an occasional 100 K.V.A. size and the essential features of equipping and installing transformers are given as follows:—

(a) **Up to 15 K.V.A. Transformers.** These can be erected on a single pole. The high voltage tapping with switchgear and transformer need not necessarily be placed on a terminal or section pole, but can be attached to any pole on the line. The connections should be of the very simplest, and may be, when on a short spur line there are several transformers, taken direct from the line to the transformer of similar rating connected. This spur line, together with the several transformers, may be group-protected by drop-out fuses or automatic reclose circuit breaker.

(b) **15 to 50 K.V.A. Transformers.** The transformer is best supported on a light platform between the legs of an H pole. If reliable fuse units are available and are of the pull-down variety, these should be used in preference to the plain drop-out type.

(c) **75 K.V.A. Transformers and Upwards.** With this capacity the transforming point should be more reliable and more readily accessible, and are best catered for by means of kiosks. The kiosk should be inserted at a section pole position so that a ganged air-break switch may be fitted on the top of each pole, the centre leads going to a cable box and then to the kiosk, which contains an oil circuit breaker, the transformer and the necessary low tension equipment. The oil switch referred to should be of the oil fuse switch pattern, this being considered the more reliable and serviceable for this duty.

With regard generally to rural substation work, the following features should be given due consideration:—

(a) As it is not economically possible to use any of the usual types of protective gear found in urban systems, the simplest forms of protective discrimination must be carefully placed.

(b) Sub-stations must be designed to eliminate constant attention.

(c) The safe and efficient earthing at transforming points.

SYSTEM OF SUPPLY AND APPLICATION

In the application of light construction 11 K.V. lines for making supply available in sparsely populated areas, it is necessary, of course, that supply to the area under consideration be furnished from primary transmission line (or a nearby power station) which forms the backbone of the area or a group of areas.

The recent interest taken in Soil Conservation by Government and people may lead to some form of directive farming, particularly as these conservation measures will affect the numerous fertile valleys in the catchment areas of important rivers. Directive farming, and more especially the type and size of farms, may bring a demand for electricity in sparsely populated areas not previously thought of.

A conductor size of .05 square inches operating at 11 KV. has definite limits to the power that can be transmitted.

Table VI shows these limits:—

TABLE VI

(.05 sq. inch 11 KV.)

	K.W. Miles
6% Voltage Drop .8 P.F.	5,500
6% Voltage Drop U.P.F.	8,200

Charts are easily prepared for any conductor size and voltage, showing the relationship between the variables of a "short line," viz: voltage drop, power factor, load and distance.

Table VI shows the concentrated load which may be transmitted in kilowatt miles, but, as is the case in rural supplies, the load on the 11 K.V. secondary transmission is distributed over the region or area, and the actual length of the line will be considerably increased as compared with the length derived from the product kilowatt miles.

It has already been said that the primary transmission would form the 3-phase backbone of supply to a given area or group of areas. Similarly, within each area, the 11 K.V. secondary transmission would form the backbone of supply to that area, and it is from this transmission that transformation would take place direct for consumers' supply.

It is contended that by shrewd management and design a substantial saving of capital expenditure can be brought about by using single-phase supply to consumers. The only disadvantage in using a single-phase supply would appear to be that single-phase motors cost more, and have poorer starting characteristics, than the 3-phase motors. Depending upon the type of farming, there would appear to be very small value from revenue of units sold for motive power (other than for irrigation), and in the majority of cases this revenue is relatively small when compared with the total horse-power installed. It is possible that the revenue from motive power would prove to be the least important factor on the whole farm, and yet it is usually because of the motor that a 3-phase supply to a farm is decided on.

It is evident that single-phase motors, correctly selected and installed, will be most reliable, and this is borne out by recent reports on the Dumfriesshire Council's scheme where approximately 700 single-phase motors installed on 520 farms range in size from 1 to 15 horse-power. In this scheme it is reported that maintenance costs are extremely low on the graduated resistance start induction motor.

TARIFFS

The aim of an electricity tariff, as of any other price formula, is to satisfy both buyer and seller. As regards the magnitude of the price, whenever a unit of electricity changes hands the figure must have been acceptable to both parties. This means that, in general, the price cannot be: (a) lower than the incremental cost to the supplier, or (b) higher than the incremental value to the consumer.

In relation to rural supplies the incremental value to the consumer is in relation to the cost of paraffin, oil, wood or coal, plus the increased value of increased productivity and quality of goods, especially in regard to dairy farms.

In their application to farms, the tariffs would best take the form of an all-in tariff, making no distinction between the purpose for which the supply is used, and this could be done by:—

(a) **A Two-Part Tariff.** The running charge for the Two-Part Tariff needs no comment, but, in regard to the service or fixed charge, careful anticipation of the farmers' reactions is necessary. The service charge may be related to size, rateable area or rooms, and in the case of farms its assessment should include for all purposes.

(b) **Variable Block Tariff.** In form, this is a Block Tariff usually with two blocks, the first one varying in size with the consumer. The principle of the tariff is that the standing charge instead of being levied as such is spread over the first block of units, so that these are sold at a considerably higher price than subsequent units.

CAPITAL EXPENDITURE AND REMUNERATION

For success, rural schemes must place at the disposal of the consumers an unrestricted electrical service and should, where possible, draw the necessary supply from an adjoining network.

As a suitable "yardstick" by which to judge payability, the analysis of the working results of several Undertakings will show that a suitable remuneration is

obtained when the annual revenue of the Undertaking is from 20 to 25 per cent. of the total capital expenditure. Another way of expressing this is by the number of units sold per £1 of capital outlay on the Undertaking. Each case, however, requires separate investigation, and due consideration should be given the varying rate of capital expenditure on Generation and Distribution.

The prices at which supplies can be offered to ensure remunerative working are dependant upon the amount of capital expenditure necessary to provide the service, apart from the cost of any bulk supply delivered to the area.

The price at which electricity is delivered by the primary transmission in bulk, can be expressed in the form £A + £K.V.A. + Unit d. in which:—

Unit d.—the running charge in pence per unit.

£K.V.A.—the charge per K.V.A. of maximum demand.

£A—a fixed charge to cover the capital charges on the cost of the primary transmission from its source of supply to its delivery point.

To this cost must be added the further costs required for erection, management and maintenance of the 11 K.V. secondary transmission, transformers, services, meters, and transport, and to allow for losses.

This may be done:—

(a) By adding a suitable percentage to the unit charge to allow for the variable copper losses.

(b) By adding a similar percentage to the K.V.A. charge to allow for standing losses.

(c) By adding to the £A charge the capital charges incurred in erecting the 11 K.V. secondary transmission and services.

In regard to the management and maintenance charges, these may be considered to be more or less fixed annual charges bearing some relationship to the gradually increasing maximum demand, in which case a further allowance for these expenses must be estimated and added to the K.V.A. charge.

The resulting total cost may be expressed in the same way, viz: £A + £K.V.A. + Unit d., and this amount in the aggregate is the required annual revenue from the consumers connected to supply.

From this point, and assuming that full information on the number of consumers is available, together with sufficient detail of the types and size of apparatus likely to be used, it is possible to frame tariffs on the lines already mentioned.

CONCLUSION

It is evident today that the machinery, at least, is available for enabling schemes, which normally would not be proceeded with, to go ahead with the reasonable knowledge that within a few years of initial development they will become payable. It is possible to imagine that, notwithstanding higher post-war costs, active and practical attention may, in the not too distant future, again be given to extending supplies to truly rural areas.

PRESIDENT:

Thank you Mr. Andrew for your Paper. I am sure it will be a very valuable contribution to the technical literature of this Association. The subject of transmission and distribution of electricity is one which is very dear to the hearts of all of us, especially with the development of the Electricity Supply Commission, and that is why your Executive decided that we should have two Papers on that subject. It was felt at the last Convention that by having three or perhaps four Papers, discussion on the Papers was stifled and it was therefore decided to allow two, to permit full discussion on the subject of the two Papers.

The Paper by Mr. Andrew is now open for discussion.

Mr. SIBSON, Bulawayo:

Mr. President, Ladies and Gentlemen. I would like to thank Mr. Andrew very

much for this extremely valuable Paper. The subject has been dealt with in a very practical and common-sense way and there is no doubt we have had contributed to us material which will be of value in the design of rural schemes, or, just to show I am equal to Mr. Andrew, of truly rural schemes. I am glad Mr. Andrew has found time to write this Paper.

There are one or two comments I would like to make. Mr. Andrew has attempted to find a method for judging the actual rating of a transformer for a single consumer's load. The use of diversity factor is usually confined to loads from more than one consumer and I think he is relying rather much upon the routine and habits of a single farmer if he anticipates that a particular load curve is likely to be maintained throughout the life of a single installation. However, he has attempted to tackle this problem and there is no doubt it has to be tackled, and I feel that his reference to single phase supply is a much better answer to the problem. By giving a farmer a three-phase supply we are dividing a possible diversity by three; by giving a single phase supply we are in fact converting one consumer into three, and therefore the best contribution to this particular problem that I derive from this Paper is a strong suggestion that single phase supplies should be examined more seriously from the point of view of rural electrification. We had some comments on this last year, arising out of Mr. Wilson's Paper, following his visit to America, when I think I made a similar comment, and I still think that the use of single phase for rural work has not been sufficiently explored by any of us so far.

The next point I have to make is a contribution to the rather difficult problem referred to in Mr. Andrew's Paper, where he refers to the "safe and efficient earthing at transforming points." This is one of the most difficult problems in rural work. In any built-up areas we have certain facilities available for reasonably safe earthing, if not the water pipe system itself—which is becoming less suitable for that purpose as the days go by—at least we have a reasonable supply of water fairly near at hand, and properly designed earthing devices can be kept moist. When we go to the country, however, we may select a point which is quite remote from a water supply and it may involve us in the difficulty of obtaining this safe earth.

I would like, therefore, to give the Conference some results and experiments we have done in Bulawayo in providing earthing points in dry soil. It arose out of certain research that has taken place in England of which we were cognisant, and involves the employment of solid copper rods driven into the earth without any prior excavation, by means of an electric hammer. A considerable depth and high compressive contact can be obtained in this way, and even in decomposed granite the rod maintains its shape and we found that we could put a rod about 12 feet vertically into the ground. By this means we obtain the conductivity of undisturbed earth at the point most needed, and we have obtained resistance figures as low as any of the more complicated devices that one is normally accustomed to instal. By the use of two such rods at a distance of about 15 feet apart we have obtained earth resistance figures of the order of 6 ohms.

I put this forward as a suggestion for some of those districts where it is normally almost impossible to get a satisfactory earth.

The only other contribution I wish to make, Mr. President, is a small point on the very difficult subject of allocating costs between rural consumers when there are more than one on the same line. Many of you may have come up against the difficulty that a supply is given to an individual who happens to be the wealthiest in the district at the time and who can afford to pay his share of those costs, and as soon as the line is up everybody in the district comes along and applies for a supply. They don't do it all at once; if they did it would not be so bad. What usually happens is that Smith having been connected at considerable cost, Jones then applies for supply, and some agreement to refund Smith a portion of his

charges is reached. Robinson then follows suit, and refunds to both Smith and Jones are needed, and this goes on until eventually you are making diminishing refunds to many people and it becomes necessary to employ a clerical staff to work out the allocations. In the meantime Jones sells his property and it is not certain to whom refunds should be made.

We, in Bulawayo, have been up against that problem for a long time, trying to be fair to these consumers and at the same time trying not to involve ourselves in too much clerical work, and where we have an area with a number of allotments or small farms and we have reason to suppose that the whole or the bulk of that area is likely, within a reasonable time, to become connected to the system, we apply a formula which takes into account the distance from the major line, i.e., the primary line, and secondly the area of the plot concerned. I think you will appreciate that the latter factor—the area—is the most important feature of all.

Whether a consumer is being connected involves us in 100 yards or two miles of line, the important fact is how far have we got to go to the next consumer, and if we have a consumer occupying a very large area, he, by that fact, makes the connection to the next one all the more expensive, and so instead of working out the exact cost in each case we now apply the following formula:

$$E = \alpha M + \beta\sqrt{A} + C$$

where

E is the hypothetical financial burden which a given consumer imposes on a distribution scheme;

M is the distance between the point of supply to such consumer and the electrical centre of gravity of the whole system;

A is the area of such consumer's property in acres;

C is the cost of the service itself, i.e., meters, cut-outs, service lines, transformer and associated H.T. and L.T. gear where such consumer is the sole user thereof.

α and β are constants empirically established to suit local conditions and costs.

The connection and minimum charges levied on the consumer are proportional to E.

Now this formula is not applicable universally. It has to be used with a certain amount of wisdom, but we have found it successful in solving many of those thorny problems where in a fairly small area we have a number of consumers with very different areas of plots and where we have had great difficulty in deciding how we are going to allocate the costs between them.

That, Mr. President, is all I have to say on this, and again I would thank Mr. Andrew for ventilating a very important subject.

PRESIDENT:

Thank you Mr. Sibson for your contribution to the discussion. Any other member care to take part?

Mr. GREEN, Victoria Falls and Transvaal Power Co., Ltd., and representing the S.A. Standards Institute:

As a visitor to this Convention, may I be permitted to add my thanks to those already expressed to Mr. Andrew for his very interesting Paper on supplies to rural areas. I hope it will receive the publicity which the subject deserves, and that it will help those who are not so intimately connected with the problem to view rural electrification in the correct perspective.

Several articles have been published recently in the Press in which the lack of development of rural schemes in South Africa is compared unfavourably with the progress which has been made in certain other countries, but no mention is made of the vastly different conditions which apply in this country, not the least of which is the national characteristic of wanting to live on as large a piece of

ground and as far away from one's neighbours as possible. The result has been to raise false hopes in the minds of many people living in sparsely populated areas which have not yet been reticulated, and a considerable loss of goodwill to the supply authorities when applications from such areas are turned down on the valid grounds that the particular scheme has been found to be uneconomic. As engineers in an industry which must at least break even in its accounts, we can only view the economic aspect from the point of view of whether a particular scheme will result in a financial return which will cover the cost of delivering the power to the respective consumers. This may necessitate the imposition of a minimum charge which, in many cases, does not bear a reasonable relationship to the service to be rendered by the supply. No one will dispute the fact that electricity is one of the most useful and essential commodities of present-day life and its value to any particular community is difficult to assess. As Mr. Andrew mentions, it is to be noted that the amendment to the Electricity Act, "permits the Minister, after an investigaion has been made, to decide whether a projected regional or area scheme may, in the national interest, be subsidised or assisted financially." This is the only way in which it will be possible to reticulate many areas and it is presumed that the Government will decide upon the benefits to be derived by the community in any area in much the same way as decisions are now reached regarding irrigation schemes.

Every endeavour must be made to reduce the cost of overhead line construction suitable for rural areas, and it is hoped that the proposed "South African Standard Specification for high voltage overhead lines on wood poles for line voltages not exceeding 11 KV" will go a long way to achieve this end. This specification is being based on BS 1320, but many modifications have been suggested to reduce cost and provide a design which is suitable for our conditions. It may also be found possible to reduce the wind loading for which lines have to be designed at present, as a review of the meteorological data has shown that a wind loading of 25 lbs. per square foot at a temperature of 22° F. is never reached in the Union. The figure which is being suggested is 15 lbs. per square foot and this would make a considerable difference in the cost of light overhead lines.

Regarding wood poles for this type of line, Mr. Andrew mentions that Eucalyptus Peniculata is one of the strongest pole timbers in the world and figures for the modulus of rupture varying between 12,200 and 24,600 lbs. per square inch are quoted in support of this statement. It would appear that figures of this order cannot be used in designing a line as the average is nearer the lower than the upper limit, and the South African Standards Institution draft specification for creosoted wooden poles gives the modulus of rupture for Peniculata as 9,000 lbs. per square inch. If the figures quoted by Mr. Andrew have been obtained after extensive tests it would appear that the proposed specification is too pessimistic,especially in view of the high factor of safety of 3.5 which has to be used in the case of wood poles, and I should be glad of the author's views on this point.

May I also query the maximum wind loading spans given in Table IV. Unfortunately the pole diameters have not been quoted in the table, but if the largest 35 foot wood pole covered by the draft specification is considered, namely, pole item No. 24, having a minimum top diameter of 7 inches and a minimum diameter of 9 inches at a point 4ft. 6 ins. from the butt end, the minimum load to cause failure is specified as 1,920 lbs. with the pole planted 6 feet in the ground and the load applied 2 feet from the top end. Applying a factor of safety of 3.5, this gives a working load of 549 lbs., which is considerably less than the figure of 982 lbs. given in the table, even when allowing for the higher modulus of rupture counteracted by the longer lever length taken by Mr. Andrew.

Adopting the method of calculating the loading as set out in the proposed "Code

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of Practice for overhead lines for conditions prevailing in South Africa," which takes into account the wind loading on the poles and loading due to the deflection of the pole, the maximum wind loading span for 3 x .05 square inch conductors works out at about 308 feet as compared with the figure of 828 feet given in the table. I shall be glad if Mr. Andrew can throw some light on this important point.

I agree with the selection of transformer sizes based on the R.M.S. load, but a note of warning has to be sounded if this procedure is adopted, as the voltage drop at peak loads might be excessive due to the heavy overload on the transformer. My Company has found that it is quite often necessary to use a larger transformer than required for the R.M.S. loading due to the excessive voltage drop which occurs with the smaller transformer.

Mr. MILTON:

I was very pleased to see Mr. Andrew's opinions on this very important subject put down in the form of a Paper. The Commission, as you are well aware, has achieved very considerable rural development, and for the purposes of your records I would like to mention briefly what has been done.

By the end of last year the Commission was supplying on its undertakings approximately 824 rural consumers. I have not got the detailed statistics for the whole of the Commission's areas but those for the Cape area may be of interest. In that area 608 consumers are supplied and their use during 1947 amounted to 4.5 million units for domestic purposes and 2.4 million units for power purposes. The amount of distribution and transmission involved is 174 miles of high voltage lines (the majority being 33kV construction), and in addition there are 77 miles of low voltage lines.

In dealing with those supplies the Commission has faced the same difficulty that every supply authority faces when it comes to establishing the form of tariff of charges to be applied. I am grateful to Mr. Sibson for having stated the formula which he has found applicable in the Bulawayo area. I can quite appreciate his qualification, however, that a formula of this description must not be taken as like unto the laws of the Medes and Persians, to be followed in all circumstances. The one objection I see to a formula of his description is that there seems to be implied a differentiation on the basis of distances from some source of supply.

In the Commission's experience, it is not advisable to differentiate on the basis of distances where you are dealing with supply in a particular locality; you must, of course, differentiate on the basis of distance when dealing with two separate areas at considerably different distances from the principal source of supply. The one objection which will arise where you differentiate on the basis of distances is that (considering an extensive system), in the course of time the consumers may ultimately come on to the equivalent of a ring main by an interconnection of the single supply systems to be fed from two different points on the "main" system. The Commission's policy has been to deal with each particular "area" on the basis of that area meeting the cost of furnishing the supply, and where possible the allocation of the cost between the consumers is made on the basis of their actual or probable individual requirements, i.e., without particular regard to "distance." By so doing one can standardise the tariff for application in a given area and adjust that tariff with the development of the area. General cases may be dealt with in one or two ways. The one way is to fix a minimum payment required from each of the users in that area, with a normal tariff for ultimate application. If the minima can be kept reasonably low, the consumers really applying electricity effectively would pay accounts on the tariff, and not the minimum. The second way is to supply at a somewhat lower tariff with an addition of a monthly "additional" charge, the monthly additional charge being reviewed with the development of the area and with changing conditions in

that area brought about by improved utilisation of electricity by the consumers. I would submit that such systems are preferable to one which is based on the distance of the consumer from the point at which the supply is tapped from the main transmission network. At the present time the Commission is being inundated with enquiries for the development of rural areas following upon the modification of the Electricity Act. I won't say that the applications have been frivolous, but in many cases they have been made with complete disregard for the cost of the service desired. There are a large number of cases which could be tackled, but, owing to the lack of material and man-power, it is found that those areas could not be developed before the lapse of at least two years and thereafter the development of what one might call the initial system, might take a period of three years. Where areas are adjacent to an existing network developments can proceed far more readily than in virgin territory.

With regard to the Commission's immediate future developments, the maximum number that is likely to be connected during the current year is a further 100. That 100 consumers, however, is only a portion of the number of consumers which the Commission has already agreed to supply, that rate of development being fixed by the availability of materials for the work and the man-power.

It is very clear that there is a large field for development, in areas in which supply can be given within the means of the applicant, and for that reason Mr. Andrew's paper is of extreme value and I would commend it for study, by those faced with this problem.

PRESIDENT:

Thank you, Mr. Milton.

Mr. KINSMAN, Durban:

Mr. President, Gentlemen, I think we should congratulate the organisation, which Mr. Milton so ably represents, on their happy position. You will recall that in my Presidential Address I said that the questions can be answered only by the Engineer-in-charge of an organisation. I am sure we all congratulate Mr. Milton on being able to answer the questions in the affirmative.

Mr. NICHOLAS, Umtata:

Mr. President, Gentlemen, this Paper has been very interesting indeed, but I feel one vital point has been omitted and that is generally speaking, the speakers have assumed and taken it for granted that having established an extension to a particular group of consumers that additional consumers can automatically be added to this extension. I would like to stress very forcibly that whenever an extension of mains goes beyond the Municipal Boundary that the Electricity Supply Undertakers should maintain control of this line, as well as ownership, even though the Electricity Supply Undertakers pay nothing towards the cost thereof. If this control of ownership is not maintained the consumers over whose property the line might have to run could make the cost of servitude so high that it would be impossible to supply consumers further afield. Therefore, the nearest consumers to the Municipal Area should only be given a supply of electricity on the understanding that these mains can pass through their property and feed consumers further afield and the servitude thereby granted without extra cost.

Mr. MULLER, Bloemfontein:

Mr. President, I would like to add my quota of appreciation to Mr. Andrew for this Paper, which has been very interesting. The discussion has also been very interesting.

I would like to spend a few minutes with Mr. Sibson on the subject of these earth rods. We are faced with sandstone and shale and so far I have not

succeeded in driving any rods through that.

There is one point in Mr. Andrew's Paper; he states that the load should be anticipated. That I agree with but I do not know how far he wishes to go, whether he means to anticipate that a rural area should be completed as a block or whether he does as we do, visualise and design the extension as a whole, to carry out that development in economic units. Our basis of development is not on the ownership of the lines by the people who want the supply; the lines remain the property of the Council and the consumer must only guarantee the revenue which would make that line worth while. In other words, we plan the whole area and then see if we can get a group of consumers that will make the first extension possible from a revenue point of view and not the payment of cash to the Council.

On the question of wood poles or other material, we found the wood poles about the only thing that could make the rural lines in our area possible, because we found that we often had to run dual lines on the poles, the Post Office having taken one side of the already congested plots, and therefore the question of very long spans did not crop up except in the main feeder to the area. One speaker referred to the question of the poles and Mr. Andrew would oblige us by going into that more fully. I think that the pole that would satisfy every span would be round about ten inches, and I don't know whether or not the Forestry Department has exhausted its supply. The heavier types, I think, would be very much more difficult to get. It may be best to stick to what they can easily supply. I may say in passing that the breaking load for a 30 ft. pole—5 to 6 inch top—as quoted by the Forestry Department, only 486 lbs., is very low indeed compared with Mr. Andrew's figures.

With regard to single-phase motors, I was wondering whether Mr. Andrew really considered the capacitor starting type of motor which is used with a refrigerator. I don't think that would be a hardship for a rural consumer, the only question would be the cost as single-phase is more expensive.

PRESIDENT:

Thank you.

Mr. WILSON, Pretoria:

Mr. President, I would like to add my congratulations to Mr. Andrew and in doing so desire to remark on one or two matters.

Reference has been made by previous speakers to the cost of single-phase motors in connection with the suggestion of using single-phase distribution in rural areas, but we should not lose sight of the fact that the installation costs associated with such motors are considerably less than applies to three-phase motors. Actually, therefore, it will be found in many cases that if one takes the complete cost of motor plus installation there is not a great deal in it from this point of view, while from the supply authority's aspect the choice of single-phase system of supply can make all the difference in the economics of supply to a particular area.

There is another matter which has not so far been touched on and that is the question of wayleaves. In Pretoria we have recently acquired a much larger area of supply—now approximately, 1,500 square miles—and in endeavouring to plan development in this area the matter of obtaining rights of way for main and spur lines is not the least of our difficulties. While, at one time, the Provincial Authorities were quite accommodating in granting wayleaves within the road reserves, they now discourage this practice while landowners are also often more than reluctant to grant the necessary rights of way. This often results in uneconomic detours being necessary to avoid the delays which would be incurred in taking such steps as are permissible under present legislative measures to acquire necessary rights and it would seem, therefore, that if rural electrification is to be pursued with a

view to furnishing supplies for the maximum benefit of the majority, then steps should be taken to obtain legislation which would make it easier for supply authorities to obtain rights of way for their transmission lines.

In conclusion, and as a matter of interest, we have recently recovered a wooden pole line which had been in service for 17 years. The portions of the poles which had been in the ground had softened to a depth of about ⅜-inch but the poles were otherwise hard and sound and have, therefore, been replanted on a line of lighter construction.

PRESIDENT:

Unless there are any more contributions to the discussion I think we will adjourn until tomorrow and that will give Mr. Andrew an opportunity of replying to the speakers.

The Convention adjourned at 12.30 p.m.

The Convention resumed on THURSDAY, the 13th May, 1948, at 9.40 a.m.

AMENDMENTS TO RULES AND CONSTITUTION

PRESIDENT:

There are two formal matters I would like you to confirm, i.e., item 11 on the Agenda, Amendments to Rules and Constitution. Owing to applications for membership that have been coming in to this Association from Northern Rhodesia and a little further afield, your Executive have given serious consideration to this matter and considered that the title of this Association should be "The Association of Municipal Electricity Undertakings of Southern Africa." Is that acceptable to you all?

MEMBERS:

Agreed.

The other one is the second paragraph of Clause 4 of the Rules and Constitution, that this should read:—

"An associate may also be an Engineer in the employ of an authorised Electricity Undertaker other than the Local Authority who is engaged in supply of electricity to the area under the jurisdiction of the Local Authority."

That has also received the consideration of your Executive Committee, who recommends it for your approval.

MEMBERS:

Agreed.

PRESIDENT:

Before continuing the discussion on Mr. Andrew's Paper, I would like to take advantage of the presence of Mr. Ritchie and that being so I would like to dispose of items 4, 5 and 6 this morning before eleven o'clock when Mr. Giles' Paper will be presented to us.

Mr. KINSMAN, Durban:

Mr. President, on a point of order, arising out of the question as to whether the word "undertaker" or "undertaking" should be used in the amendment to Clause 4, I suggest the word is "undertaker" and not "undertaking" in terms of the Act. It defines an Undertaker as the person, the Commission, the Railway Department or Local Authority, and the Engineer is in the employ of the undertaker and not the undertaking.

PRESIDENT:

That is the Constitution and we must adhere to it, and so it is agreed? Thank you Mr. Kinsman.

Item No. 4 deals with Standards and I would ask Mr. Downey to deal with it please.

S.A. BUREAU OF STANDARDS
Safety Codes and Other Committees

Mr. J. C. DOWNEY, Springs:

(a) Safety Codes Committees

Mr. President, Ladies and Gentlemen, I have to report that the Safety Codes Committees have been meeting as frequently as reasonably possibly, i.e., at

not longer intervals than six weeks, and in many cases, at intervals of only three weeks.

In order to speed up the tremendous volume of work confronting these Committees, the policy of all day meetings was decided upon. Many of the specifications are now complete in draft form, awaiting comment, and many are in the hands of the translators. As you are aware, the specifications being dealt with by these Committees are compulsory specifications, which means that articles made in or imported into the Union will not be permitted to be offered for sale unless they comply with the S.A. Bureau of Standards specification for such articles and have the appropriate S.A. Bureau of Standards mark on them. It must be fully understood, however, that these specifications are in the interests of the safety of the user, and it therefore follows that certain quality standards must be attached to the goods or articles in order to make them safe.

The specifications do not aim at quality only.

The following is a list of the specifications dealt with or being dealt with at present:—

General Requirements.
Snap Switches.
Immersion Heaters.
Electric Radiators.
Insulated Mouldings.
Fixed Electric Water Heaters.
Domestic Electric Clothes Washing Machines.
Plugs and Sockets.
Plug and Socket Adapters.
Electric Kettles, Jugs and Saucepans.
Heating and Heating Elements.
Rubber Covered Flexible Cords.
Rubber Insulated Cables.

From the foregoing it will be noted that the work of this Committee is aimed at being instrumental in removing inferior grade materials and appliances from the market.

As Mr. Ritchie, the Director of the S.A. Bureau of Standards, is with us, perhaps he will inform us of the position in regard to P.V.C., viz., whether it is intended to draw up a specification for this type of insulated wire or not?

In addition to the foregoing, I have to report that your Association is represented on the S.A. Bureau of Standards Lamp Specification Committee, which is, for obvious reasons, not a compulsory specification. The importance of this specification to this Association will be readily appreciated, as Municipalities are the largest users of lamps in Southern Africa.

I formally move the acceptance of this report.

PRESIDENT:

Thank you, Mr. Downey. Would Mr. Ritchie care to comment on that report?

Mr. RITCHIE:

Mr. President, Gentlemen, Mr. Downey has already outlined the programme of these Committees. As he says the specifications merely control the safe construction of the appliances and do not specify the performance of such articles.

General requirements for electrical materials and equipment are required in all of the specifications. This general specification has been drawn up with the intention of specifying in proper terms various fundamental considerations to be observed in the construction of all electrical appliances in order that such considerations need not be repeated in each individual specification. This general specification has been completed and will be published shortly. The Standards Council will allow the manufacturers approximately a year in which to get rid of their old stocks and to obtain new stocks conforming to the specification.

PRESIDENT:

Could I ask if all those specifications are available to members if they require them?

Mr. RITCHIE:

Copies of the drafts are available. The specifications when prepared will be sold

at 5/- a copy. In connection with specifications, it may be mentioned that the Bureau is also doing specifications for general filament lamps. The committee is giving consideration to the improvement of the cement and also the lamp's ability to stand vibration.

I might sound a note of warning. A large number of goggles are being sold in the country and although they are nice and dark do not afford the necessary protection that they should. I might mention that the Bureau now has a large number of laboratories and is able to carry out tests of all sorts.

PRESIDENT:

Thank you. I take it that the list of specifications will be available to any member who cares to apply for it?

Mr. RITCHIE:

Yes.

PRESIDENT:

Mr. Ritchie made reference to P.V.C. wire and that is receiving the consideration of your Executive together with the Bureau of Standards and the Safety Precautions Committee, so I would like you to leave it at that stage.

Now, are there any points to be raised?

Mr. MORTIMER MAIL, Kokstad:

Yes, there is one, Mr. President—radio sets are used in every house, the A.C./D.C. set. There is a number of them on the market which are fully alive on the aerial and anyone touching the aerial can get the full current—on the A.C./D.C. set only.

PRESIDENT:

I take it that Mr. Ritchie will also recollect that this subject was raised at last year's Convention and I will ask him to reply to the question.

Mr. RITCHIE:

That is one of the 20 others I mentioned, but if Mr. Mail feels that it is now a matter of some urgency the Bureau can arrange to compile the specification at an early date.

The Bureau has also been approached by the American Manufacturers' Association which has stated they want the Bureau to stop the sale of what they call "these hot A.C./D.C. sets." This specification will be dealt with at any early date.

PRESIDENT:

It is a matter which concerns us all very much, so as I said earlier, it was brought up at the last Convention, and I think it would be desirable for an expression from this Association that this should be given early priority.

MEMBERS:

Agreed.

PRESIDENT:

Thank you, Mr. Ritchie, if you could do that we would be obliged.

Any further discussion on the Report and Mr. Ritchie's comments thereon?

Mr. BRADLEY, Port Elizabeth:

There is only the feature I think that where the Bureau finds something that should be given immediate attention in the respective areas in which we work we should be told about it. The Standards Bureau may discover something that is dangerous and how are we to know when that has been achieved, or when they think we should take action in our respective areas?

Mr. RITCHIE:

I think Mr. Bradley means temporary approval because once a specification has been published the Bureau will control the sale of this commodity throughout the country. The Bureau could make arrangements for such discoveries to be published in the Standards Bulletin—I suggest that all members ought to subscribe to it. The Bureau could arrange

to have an interim statement made, e.g., that a certain type of water heater is being marketed which is not safe. I think it would be better than circularising members.

PRESIDENT:

I think it is an excellent suggestion of Mr. Ritchie's. Any further comments.

Mr. SMITH, Chief Inspector of Factories:

Mr. President, I would like to record my appreciation of the work done by the Standards Bureau in this respect. The Department has been frequently approached in connection with Machinery Regulations to prohibit the sale of certain unsafe articles, particularly in the electrical lines, but in other ways also in regard to certain machinery. Such machinery should not be marketed unless it complies with Machinery Regulations. The difficulty is that the Factories Act does not control the sellers, importers, or agents or the manufacturers; it merely controls the "user." Therefore the onus has rested entirely on the user to see that his machinery and appliances are in compliance with the Regulations.

I would like to explain to members that by means of the Standards Act this difficulty is being overcome now and that with the assistance of Mr. Ritchie and his organisation I think considerable improvements will be brought about, in that, by means of the Standards Act, any unsafe articles will not be allowed to be sold and it is because of this innovation and tremendous step forward in safety that I take this opportunity, Sir, to place on record my appreciation of the safety work done by the Standards Bureau. Thank you, Sir.

PRESIDENT:

I think it is appreciated by all members present the advantage of this liaison between the Chief Inspector of Factories, Mr. Smith's Department and Mr. Ritchie's Department, so that we Engineers do have a little assistance when ordering materials. We can be satisfied that these must comply with the standards of the Bureau of Standards. When we order boilers they must comply with the Factories Act and it is very nice to know of this liaison between the two Departments.

Cr. THOMPSON, Johannesburg:

The other thing, power of appeal by any manufacturer or supplier?

Mr. RITCHIE:

Yes, if he is not satisfied he can appeal to the Minister and he can, if he is not satisfied then, finally take it to Court. The Standards Council is a corporate body capable of being sued.

Cr. S. J. THOMAS, Brakpan:

Is it arranged that articles sold which comply with the Regulations will bear a standard mark so that the public will know?

PRESIDENT:

Yes, I think I can assure the Convention that every article that has been passed by the Standards Bureau will bear their stamp. Is that correct?

Mr. RITCHIE:

Yes and no. What might be called the Bureau stamp is the S.A.B.S. mark. That is what the Bureau hope will come in time, but the Bureau reserves that mark for commodities which conform to specifications which indicate definite quality. As indicated earlier, the compulsory specifications are only in respect of safety and therefore do not refer to quality. The Bureau will have a separate mark for these safety appliances. The ordinary mark is not awarded to overseas manufacturers yet because we feel that we must have some control over the manufacture of the product. In order to enable overseas manufacturers to put this new mark on, this safety mark, the Bureau will probably adopt the same system as the Canadians, i.e., use a label. The Bureau has not yet decided what the mark will be. The Bureau will sell the labels in the same way as the Canadians do in order to cover the cost of testing.

Mr. BRADLEY:

The difficulty is that electrical appliances are brought into the country and they are sold before we get to know about it. I had an occasion where a local Bazaar had imported some radiators. They were taken to one house and the lady of the house fortunately did not do other than get a shock from it. I tested it and had great trouble to get the Bazaar to stop the sale of these things, so I brought the manager into the office and gave him a good demonstration. He immediately went back and tried to recover the radiators sold and stopped the further sale of them. But can we get the Standards Bureau to have some means of testing the materials brought into the country before they are put up for public sale?

Mr. RITCHIE:

I might mention that before any article is approved the manufacturers will have to submit one article for test before they get the label at all, and the Bureau will also work in conjunction with the customs so that any non-approved articles will be stopped at the ports. The manufacturers will have to write to us and submit each type of article for test. Once the Bureau has tested it and approved of it they will be allowed to apply for labels.

PRESIDENT:

The importer would just import his goods into South Africa and the retailer would purchase them and they would be sold to the public, that is the point where Mr. Bradley is a little concerned, as to whether there is any means of stopping the sale of these undesirable appliances.

Mr. RITCHIE:

I am sorry if I am misunderstood; nobody will be allowed to sell any electrical appliances unless they comply with the specifications and otherwise they will be liable to prosecution under the Standards Act.

PRESIDENT:

That, I am sure, is very illuminating to members.

Mr. FRASER, Johannesburg:

Can Mr. Ritchie give us any idea when that will be enforced.

Mr. RITCHIE:

The Bureau is doing its best to right an unsatisfactory position. The general specification will be published early in 1949.

It is satisfactory to know that action is being taken. Is there any further discussion on that subject? If not, I will proceed to item (v) S.A. Bureau of Standards—Meter Testing Code. I would ask Mr. Downey to open the discussion and we can then take advantage of the presence of Mr. Ritchie and Mr. Clarke. I think it will be very interesting to members present.

METER TESTING CODE

Mr. J. C. DOWNEY, Springs:

I have to report that the Meter Testing Code of the S.A. Bureau of Standards is now complete after laborious deliberations by the Committee and many investigations carried out by the Bureau officials.

The Committee recognises the importance of correct metering today. It realises that there must be many meters which have been in service for at least twenty to thirty years that have not been tested, and that small centres have not the testing facilities or the staffs of the larger centres. Transportation also has not escaped the consideration of this Committee.

As we have with us today Mr. Clarke, the Meter Engineer of the S.A. Bureau of Standards, I would like to suggest, Mr. President, that you ask Mr. Clarke to speak on the Code and its general application.

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PRESIDENT:

Thank you, Mr. Downey. I would now ask Mr. Ritchie to deal with the matter generally and then Mr. Clarke will reply to any technical details that may be raised by members.

Mr. RITCHIE:

I think it would be best to open the discussion by allowing Mr. Clarke to read a short Paper on what the Bureau intends to do or how it intends to administer the Code and how the Bureau hopes to assist the smaller municipalities. After Mr. Clarke has read his Paper I would like to make a few remarks before the general discussion.

PRESIDENT:

If that is agreeable to the Congress I will ask Mr. Clarke to take over.

S.A. BUREAU OF STANDARDS PROPOSED ADMINISTRATION OF THE ELECTRICITY METER CODE

Mr. G. E. CLARKE, Meter Engineer, S.A. Bureau of Standards.

Mr. President, Ladies and Gentlemen, I wish on behalf of the South African Bureau of Standards to thank you for the opportunity to address you on the Electricity Meter Code. In response to a request for comments on the first draft of a proposed meter testing code circulated to Municipalities in 1946, many useful suggestions were received and these proved to be of great value to the meter code committee. At the same time, however, many enquiries were received on matters dealing with the administration of the code, methods of certifying meters, and equipment required for testing.

In those early stages it was, of course, impossible to do more than acknowledge enquiries with a view to giving the required information at a future date. It is hoped, therefore, that this afternoon the outline of the Bureau's proposals will in some measure answer the enquiries which have been outstanding so long.

Time, today, does not allow me to go into details on the figures which will be put before you, but I would like to state here that the Bureau has given full consideration to the importance of capital expenditure, absence of skilled personnel, and the general lack of existing facilities and premises throughout the Union.

Without further preamble, therefore, I will give you as briefly as possible, a resumé of the proposed administration of meter certification.

The Electricity Meter Testing Code

This consists of a statement setting down all the requirements of a Meter Testing Station, the limits of accuracy to be maintained, and the methods of testing to be used by Municipalities, Supply Companies and other bodies who use electricity meters which come within the scope of the code.

The Code is in two volumes, each volume being split up into several parts as follows:—

Volume I deals with the application of the Code, limits of error, methods of testing, and a schedule for standardising sub-standard instruments. These subjects are covered in three separate parts.

Volume II contains specifications for standard and sub-standard apparatus and equipment for use in connection with the code for testing KWhr. and Ampere hour meters.

It will be appreciated that the code which covers a wide field, is of necessity confined to specifications and definitions only. Realising, however, the need for some guidance in interpretation of the requirements contained in this document, the committee agreed that some further publication was desirable. Accordingly, the Bureau is now compiling "Explanatory Notes" for use of testing personnel. These will be framed so as to set a common mode of procedure for testing and standardising instruments and will also contain much helpful information which could not be embodied in the code itself.

Classification of Meter Testing Stations

Testing stations will, in general, be classified according to the apparatus used and will fall into one of three classes as follows:—

"Class A": Those stations equipped to undertake the testing of all sub-standard apparatus used for meter testing as well as the testing of all types of KWhr and Ampere hours meters.

"Class B": Those stations equipped to undertake the testing against sub-standard indicating instruments of rotating sub-standard Watt-hour meters and Ampere hour meters and the testing of all KWhr and Ampere hour meters.

"Class C": Those stations equipped with a minimum of apparatus for testing A.C. single-phase and D.C. meters.

It will be necessary for testing authorities to obtain the Bureau's approval certificates for each item of testing apparatus before putting it into use; accordingly, therefore, all standard and sub-standard apparatus will have to be sent to the Bureau for standardising. Detailed instructions will, however, be given at a later date so that undertakings will know precisely what procedure to adopt.

Administration of the Code

For the purposes of certification of Undertakings' Meters the Bureau will appoint officers whose duties it will be to visit meter testing stations regularly for the purpose of testing say 5 per cent. of the meters submitted to him for certification. For this purpose special meter certification forms will be printed and Undertakings may order these from the Bureau according to the quantity of meters dealt with. The forms make provision for recording the data for all tests taken. Twenty meters can be entered on one form and carbon copies of all forms will be kept in the Bureau's record system. They will be in book form, a separate book being provided for each type of meter, that is, for A.C. single-phase, and poly-phase; and D.C. meters.

Identification of a certified meter will be by means of a lead seal of the same pattern as is already in use by Undertakings. It will be distinctive only in that it will be larger (11 x 12 x 5 m/m) and will be marked with the letters "S.A.B.S." and the word "certified." Sealing pliers for this purpose will also be obtainable from the Bureau of Standards.

Visits to the testing stations by the Bureau's officer will be mutually arranged with the engineer-in-charge and will be regulated so as to avoid delays caused by meters waiting to be certified.

Approved Patterns of Meters

The Bureau is at present drawing up a schedule of patterns of meters approved for use in the Union; this is intended to include only meters capable of compliance with limits of error laid down in the meter code.

Full information of the makes and types existing in South Africa is not yet available; it may, therefore, take some considerable time to finalise the schedule. In the meantime it is recommended that all new orders call for meters to comply with British or American specifications or codes for electricity meters.

Comprehensive Scheme for Maintenance and Certification of Electricity Meters throughout the Union and South-West Africa

It has already been stated that the Bureau has given full thought to questions of capital outlay and personnel, but it will be interesting to consider for a moment some facts and figures on this subject.

The relative costs of setting up testing stations under classifications "A," "B" and "C" are respectively £7,000, £4,500 and £750 approximately. The working costs would include return on capital, rent, rates, taxes and insurance together with wages, materials, administration and other sundry charges. It is, therefore, easy to show that for an undertaking having 600 meters or less the cost per meter would be prohibitive. Since nearly two-thirds of the undertakings in the

Union have only 600 meters or less some system of group testing would appear to be the most economical solution.

The possibility of one undertaking testing for several others was next considered, and here it will be interesting to quote a few statistical figures. Of the total municipalities in the Union 12 per cent. would have to test less than 25 meters per annum, 26 per cent. between 25 and 50 meters per annum, 20 per cent. between 50 and 100 meters per annum, and 9 per cent. between 100 and 200 meters per annum. Eleven principal cities in the Union have in service collectively 47,000 meters out of the 65,000 meters to be tested per annum. The remaining 18,000 meters are fairly evenly located over some 300,000 square miles. Thus, it will be seen that only 27 per cent. of the meters are owned by 95 per cent. of the municipalities. Furthermore, practically no meter testing equipment of the required standards exists amongst these municipalities. These circumstances illustrate the need for communal testing. Unfortunately, however, when considered from the view point of a small scale area it was found that the scattered location of the small towns, the low number of meters per town, the heavy capital outlay on equipment, and high running costs all combined to make the ultimate cost per meter unreasonably high. This was shown by calculating the costs for hypothetical schemes based upon one station carrying out testing for several other municipalities within a radius of 150 miles.

Consideration was next given to the operation of communal testing on a much larger scale; this was found to be more encouraging and so a general scheme was built up for the whole of the Union.

Proposed General Scheme for Meter Testing and Certification

With the foregoing points in mind the Bureau carried out a survey of the probable costs of a testing station with an output of 10,000 meters per annum from which it was possible to obtain an optimum cost per meter covering overhauling, calibration, and certification as follows:—

A.C. single-phase meters: 16/- per meter.
A.C. poly-phase meters: 30/- per meter.
D.C. Meters ..... 32/- per meter.

As these figures were, on good authority, accepted as reasonable and considered sufficient to cover removal costs also, the aim in the following scheme has been not to exceed them. Indeed, it has been possible in the majority of cases to reduce the costs.

Proposed Areas for Meter Testing

The Union has been divided into twelve areas the boundaries of which have been mapped out in such a way as to make full use of the railway system of the South African Railways. This has been the deciding factor in the case of each area since, with few exceptions, all the towns have rail facilities available. Another consideration was to arrange for the area meter testing stations to be situated at a convenient junction, where this was possible, thus providing for meter consignments converging on that junction from all points of the area.

The area testing stations have been provisionally chosen as follows:—

Bloemfontein: Serving the O.F.S. Class A.

Cape Town: Serving the Southern Province. Class A.

Durban: Serving Natal. Class A.

East London: Serving the Eastern Province. Class B.

Germiston (V.F.P.): Serving Southern Transvaal. Class B.

Kimberley: Serving the Western Province. Class B.

Krugersdorp: Serving the Western Transvaal. Class A.

Ladysmith (Escom): Serving the North East and North West Natal and O.F.S., respectively. Class B.

Port Elizabeth and Worcester (Bureau): Serving the south-eastern and central provinces. Class A.

Pretoria: Serving Northern Transvaal. Class B.

Springs: Serving East and South Eastern Transvaal. Class B.

Of these twelve stations nine are operating at the present time and, with the exception of one or two items of equipment, are of the required standard. The Germiston station planned by the V.F.P. Co., and the Worcester station, which could be equipped by the Bureau of Standards, are the only two stations having no equipment. The total capital value of equipment at present in use by Undertakings is, on current prices, approximately £55,000. In order to carry out the scheme proposed herein the additional expenditure on equipment would be £12,000, or say 20 per cent. Charges on this capital would be shared by some 250 municipalities according to the number of meters tested for them.

It must be stated here that the existing class "A" station of the Johannesburg Municipality, which has some 90,000 meters connected to its mains, would be fully employed on its own meters and would not, therefore, be called upon to undertake maintenance and testing of other Undertakings' meters.

It would also be desirable for Escom to operate either or both the Worcester and Ladysmith stations, the Bureau will, however, take steps to discuss this with the parties concerned at an early date.

Transport

Arrangements for transport by rail will be discussed with the South African Railways and Harbours with a view to their co-operation in the form of special freightage rates for the cases used for transporting meters. It is estimated that the maximum cost would be 1.3 shillings per meter.

Since the cases will be specially designed it is anticipated that transit troubles, normally suffered by meters, will be eliminated.

In general, the number of cases of meters railed per annum by any one municipality will not exceed twelve, and the maximum number of cases handled by an area testing station will be approximately 65. There are one or two instances where an Undertaking has a fairly large number of meters to be tested per annum but in each case the Undertaking is within a short distance of the area testing station so that road transport can be used.

Costs of Maintenance and Certification

Independent and detailed costs have been worked out for each area testing station on the basis of cost per meter. From these figures it can be stated that for single-phase meters the highest cost is 16.0/- at Ladysmith, whilst the lowest is 9.5/- at Durban. This amounts to a maximum cost per meter of just over 2.9/- per annum, on a basis of overhaul and certification once every six years, and inclusive of transport charges and Bureau certification fees.

Polyphase meters will cost 34/- maximum at Germiston to 25/- at Durban, giving a maximum of 6/- per meter per annum.

D.C. meter costs are rather higher but as the number of D.C. meters in service will be very considerably reduced during the next eight years this can be regarded as only a temporary expense. The highest cost of 37.3/- occurs at the Worcester station, whilst the lowest is 31.4/- at East London, giving a maximum cost per meter per annum of 6.4/-.

It should be noted here that only six of the area testing stations would be called upon to deal with D.C. meters, these being Bloemfontein, Cape Town, Durban, East London, Pretoria and Worcester.

Two stations, Ladysmith and Kimberley, would test only single-phase meters, whilst the East London station would deal with single-phase A.C. and D.C. meters only.

In order to illustrate the all-round reduction achieved by large scale communal testing, I will give you some comparative figures calculated for several undertakings.

Taking first the case of four of the area testing stations and assume they test only their own underatking's meters, we find that the cost per meter rises by

the following percentages.

East London: 31%
Kimberley: 32%
Krugersdorp: 75% single-phase and 57% polyphase.
Ladysmith: 79%

Considering now one or two Undertakings which had no existing facilities for testing but wish to set up a testing station for their own needs, the heavy capital charges and low number of meters to be handled would make the costs per meter higher than the charges of an area testing station by the following percentages:

Graaff-Reinet: 58%
Rustenburg: 50%
Witbank: 113%

Skilled Personnel

One of the major problems of setting up a large number of testing stations is the necessity for skilled meter and instrument repairers and testers, and supervisory engineers. The scheme which has just been outlined to you overcomes this difficulty to a large extent since the number of skilled operatives required is only 45. At the present time there are 40 skilled operatives employed by the principal municipalities who already make a practice of testing all their meters before installation in service. The total personnel for the whole scheme is 132 whilst at the present time some 77 people are employed on meter testing work.

Conclusion:

Summarising the foregoing it can be stated in brief terms that in order to carry out the maintenance and certification of electricity meters throughout the Union of South Africa the existing capital equipment must be increased by only 20 per cent. amounting to £12,000 approximately. This small increase in capital makes maintenance of meters available to an additional 95 per cent of the Undertakings in the Union and will meet the Undertakings' requirements at least until 1960.

The total cost per annum for overhaul and certification of meters will be £48,000 as compared with an existing annual expenditure of £37,000. The increase in skilled personnel amounts to five operatives, many of which vacancies could be filled by promotion of members of existing meter department staffs or by training juniors for such work as single phase meter testing and repairing.

The proposals, therefore, constitute only a little more than a reorganisation of all existing available facilities in the Union, and with comparatively little increase in equipment, etc., the sales of £7,000,000 worth of electricity will be metered to a degree of accuracy and reliability commensurate with the equity desired by both supplier and user.

PRESIDENT:

Before adjourning for tea, I would ask Mr. Ritchie to just give a few comments on this subject and we can continue the discussions on this matter this afternoon, that is we can ask Mr. Giles to give his paper at eleven o'clock and this afternoon we shall have all that period for discussions on the various Papers presented and the balance of the Committees' Reports, so that is the programme today. Mr. Giles' Paper at eleven o'clock, the balance of discussions on the meter subjust this afternoon, together with Mr. Andrew's Paper and other Committee Reports.

Mr. RITCHIE:

Mr. President, Gentlemen; the Meter Code, as already stated, has been completed and will be published shortly. It has been accepted now by the Electricity Board. Some objections, however, have been raised by the Johannesburg Chamber of Commerce that the promulgation should not be carried out for some time, and the main objections were, firstly that the country is short of trained personnel and secondly that at this stage it would involve the country in unnecessary capital expenditure. They recommended that the Code should be delayed until there is a depression.

I should like to speak on those two points. Firstly on the scheme submitted,

it will not require more than five more skilled people in the Union. It will require 45—you already have 40. The testing of single-phase meters could be carried out by comparatively unskilled people as in England, where they have girls to do this work. It is repetition work and does not require a trained person. We already have nine stations and we require 12.

Mr. President, the other ojection is that South Africa should not promulgate the Code at this stage but that we should delay it because of capital expenditure. There is so much money being spent on much more frivolous things that I think consideration should be given to stopping such expenditure. The consumption of electricity is going up by leaps and bounds and it is likely to double itself in the next ten years. The total additional cost of this scheme is only a matter of £20,000 or £30,000, taking into consideration taxes and everything else, so I think it is unreasonable to suggest that this scheme should be delayed. After the promulgation of the Code there is a two-year period before the Code is put into effect. After that it is intended to handle only 10 per cent. of the total number of meters in the first year, the following year 20 per cent. and so on until after a further eight years of the promulgation of the Code all the meters should have been tested.

After that the Bureau will relax the period of testing to once in ten years instead of a six year cycle. If you take these factors into account there is no reason why the Code should not be promulgated at an early date.

PRESIDENT:

The time factor or element touched upon by Mr. Ritchie is of great interest to us all, so we will resume discussion on this matter this afternoon and will now adjourn for refreshments.

Congress adjourned at 10.46 a.m.

Congress resumed at 11.10 a.m.

PRESIDENT:

Before resuming, I have been informed that the Mayoress of Klerksdorp met with an accident at the hotel and I think it would be very nice if we sent a message to her, wishing her a speedy recovery. Are you agreeable to this?

MEMBERS:

Agreed.

PRESIDENT:

I will now call upon Mr. Giles to give his Paper and his subject is "Some Economic Factors in the Purchase and Use of Electrical Plant with Special Reference to the High Price of Materials." This is a matter with which we are greatly concerned, and I am sure that this Paper will be a very valuable asset to the Proceedings of this Association. I will ask Mr. Giles to proceed with his Paper.

SOME ECONOMIC FACTORS IN THE PURCHASE AND USE OF ELECTRICAL PLANT WITH SPECIAL REFERENCE TO THE HIGHER COST OF MATERIALS

by

P. A. GILES, A.M.I.E.E., A.M.I.Mech.E.

The preparation of plans and specifications for an electricity supply to prospective consumers in the Municipal Area entails examination of the problems involved from two angles; the first is technical and the second is financial. The technical aspect will involve the planning of the disposition of each portion of equipment to be purchased and used. In addition, a very clear specification of the duty of each component has to be laid down.

The second angle—the financial one—involves the selection and purchase of each component or part for the system with due regard to the economic aspect of purchase and use, and in times of high prices for electrical equipment this viewpoint becomes important. If the financial

and technical aspects of the problems are satisfactorily reconciled then an adequate and efficient electricity supply at the lowest cost can be realised.

From the point of view of economy the factors to be considered are Capital Expenditure, operating costs, and efficiency, and in what follows it is proposed to confine consideration to these three points only.

Normally it would be expected that the most efficient machine would entail the highest capital expenditure because of the increased cost of furnishing elaborations and refinements designed to increase the intrinsic efficiency of the plant. Also it could be anticipated that the machine with the highest efficiency would have the lowest operating cost. Sometimes this may not be the case because the minimum amount required for operating is the sum of the capital charges and the running costs, and if the capital expenditure is too high then the capital charges will be a maximum and the operating cost may be higher than those of the less efficient and less costly machine. Thus it is desirable in order to secure a power plant producing electricity at the lowest possible cost to purchase equipment with due regard to the balance between capital charges and running costs so that these two amounts when added together result in the lowest operating cost. The object should be to secure plant having the highest efficiency commensurate with the lowest operating figures. A plant with a low initial efficiency would eventually, after use, have a lower ultimate efficiency and would prove expensive in the long run mainly on account of continually increasing running costs. In considering the purchase of equipment of high efficiency a decision has to be made whether the higher degree of efficiency justifies the greater investment involved; whether the more assured continuity of electricity supply, the greater safety and ease of operation or additional automatic features which can be provided, are worth their extra cost.

It will be noted that a comparison has to be made between capital expenditure which is incurred over a comparatively short period, with recurring annual costs spread over a long period, and consequently an extensive detailed series of accounts and statistics have to be studied, and from the mass of information and data made available by this means certain underlying economic laws and deductions are applied.

These underlying laws are concerned with the marginal costs which vary with the changes in price, rates of interest, efficiency, and so on. When the matter under consideration is the installation of a refinement in the plant equipment and an attempt is being made to save investment expenses then the amounts shown as savings should include only the costs actually obviated and not the fundamental amounts necessary to operate the undertaking whether the refinement is installed or not. These economic laws, which are used to decide the merits of each part of an electricity supply system, are not applicable when a tariff for the system is being evolved. A tariff, as such, should include every cost, fundamental and marginal, otherwise the undertaking will work at a loss.

PROFIT RATIO

One of these deductions is the ratio of profit or surplus from the annual income of the undertaking, compared with the capital expenditure for a given load. It is realised, of course, that an electricity supply from a municipality is worked on the principle of service to the public and as such should have balanced accounts and work at neither a profit nor a loss. In practice it is necessary to budget for a surplus in order to prevent the electricity department becoming a charge on the general rate of the town.

The ratio of profit to the capital expenditure is shown for a suppositious design of an electricity supply system in Figure I. Analysis of this graph will show:—

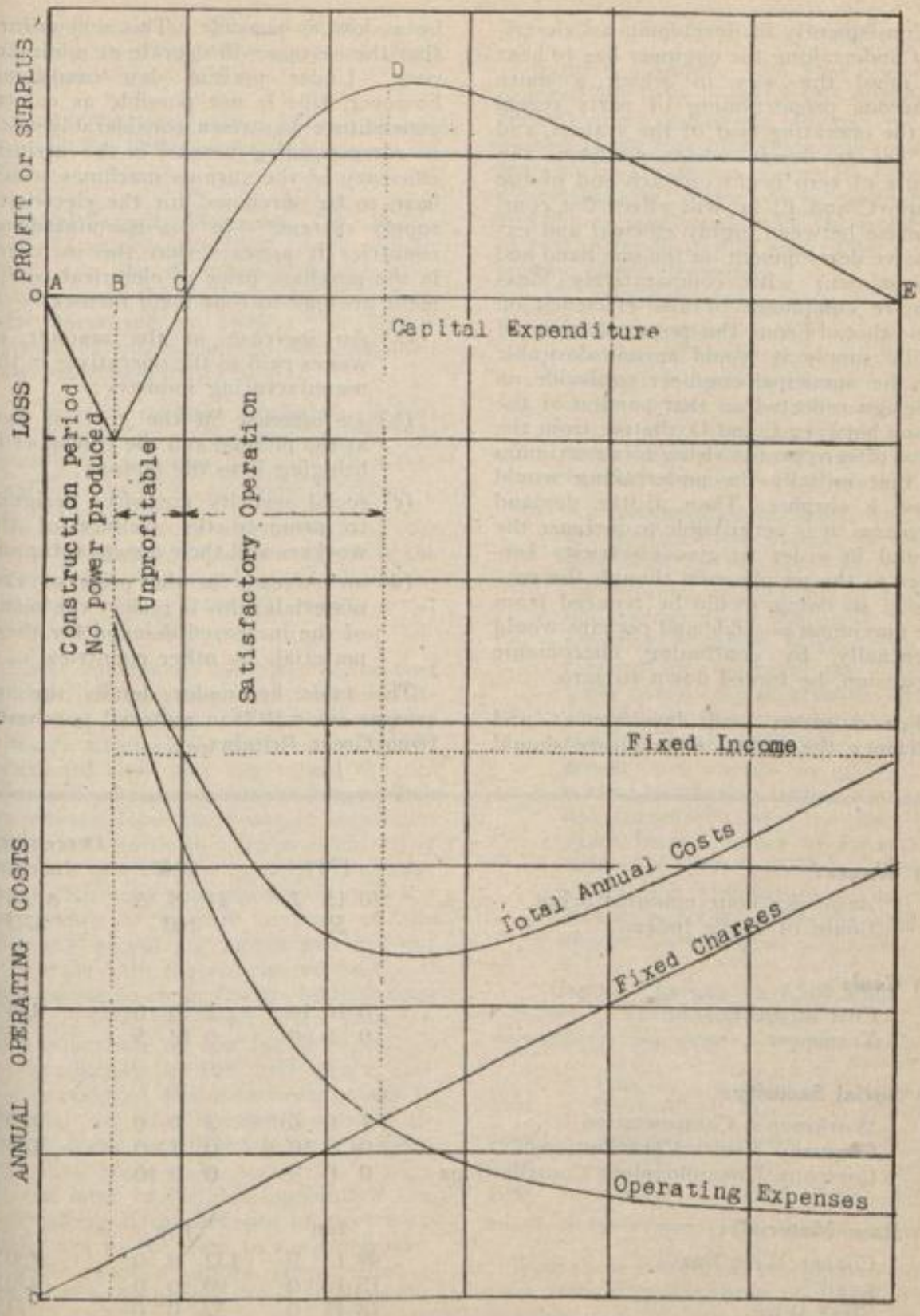
(a) If the amount for capital expenditure is kept unduly small the efficiency of the machines purchased

would be so low that the operating expenses and consequently the annual costs of running would be higher than the fixed income that could be expected, and the system would operate at a loss as shown on the first portion of the graph A-B.

(b) If a more generous design entailing a larger amount for capital is permitted, then a higher efficiency plant can be purchased and this more efficient equipment would cut the losses to zero so that the investment would be just carrying the fixed charges and the operating costs. This is indicated on the second portion of the graph B-C.

(c) By continuing to increase the capital expenditure and securing still more efficient plant and equipment a profit could be made from the excess of income over the cost of production, until a point is reached where maximum profits occur, as reflected on the graph between the points C and D.

(d) By the expenditure of further capital in the purchase of still more elaborate and consequently more efficient plant, the operating expenses are further reduced, but the increased capital charges on this expensive material more than counter balance the reduction and consequently the profits decrease steadily. This decrease in profits follows the economic law of diminishing returns and is shown on the graph from D-E.


PROFIT or SURPLUS
LOSS
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D
E
Capital Expenditure
Construction period
No power produced
Unprofitable
Satisfactory Operation
Fixed Income
Total Annual Costs
Fixed Charges
Operating Expenses
CAPITAL EXPENDITURE

Figure 1.

Consequently in developing an electricity undertaking the engineer has to bear in mind the way in which a more generous proportioning of parts reacts on the operating cost of the system, and he has to decide where, between the points of zero profit on each end of the graph C and E, he will effect the compromise between highly efficient and expensive development on the one hand and development with comparatively inexpensive equipment of low efficiency on the other. From the point of view of public supply it would appear desirable for the municipal engineer to decide on a design reflected on that portion of the graph between C and D, that is, from the point of zero profits rising to a maximum so that initially the undertaking would show a surplus. Then, if the demand increases, it is permissible to increase the capital in order to give electricity services to the people even though the profits in so doing would be reduced from the maximum possible and perhaps would eventually, by continuing uneconomic expansion, be forced down to zero.

For a given load development and efficiency the capital expenditure should be as low as possible. This will ensure that the system will operate at minimum cost. Under present day conditions, however, this is not possible as capital expenditure has risen considerably with no corresponding increase in the intrinsic efficiency of the various machines which have to be purchased for the electricity supply system. In the manufacturing countries it appears that the increases in the purchase price of electrical equipment are due to four main factors:—

(a) An increase in the amount of wages paid to the operatives in the manufacturing industry;

(b) an increase in the cost of coal at the pithead and the transport in bringing it to the factory;

(c) social security measures designed to promote the welfare of the workers and their dependants; and

(d) an increase in the price of raw materials; this is mainly the result of the increased demand for these materials by other countries.

The table hereunder details the increases since 1939 in material purchased from Great Britain:—

	1939	1947	Percentage Increase
(a) **Wages:**			
Basic per hour manufacturing	£0 15 7	£1 8 5	81.85%
Board of Trade Index	55	103	87.3%
(b) **Coal:**			
Cost at pithead	0 16 10	2 0 0	138%
Transport	0 8 0	0 12 5	56%
(c) **Social Security:**			
Workmen's Compensation	1 0 0	2 0 0	100%
Company Health Contributions	0 0 10	0 2 0	140%
Company Unemployment Contributions	0 0 9	0 0 10	11%
(d) **Raw Materials:**	ton	ton	
Copper Wire Bars	49 13 9	132 0 0	166%
Lead	15 16 0	90 0 0	470%
Steel Wire	18 15 0	32 0 0	71%
Tape	13 4 5	21 4 6	59%

Wages have increased by 81.85%, thus affecting the Board of Trade Index which has increased by 87.3%.

Coal. The cost at the pithead has increased by 138% and the transport by 56%.

Social Security Measures. The Workmen's Compensation has increased by 100% and the Companies Health Contributions to the welfare of the workers have increased by 140%. The Unemployment Contributions by the Companies have increased by 11%.

In regard to **Raw Materials,** copper wire bars have increased by 166%, lead (a very scarce commodity now) by 470%, steel wire by 71%, and tape by 59%.

In addition to the above the final cost of the product has been increased at the factory due to irregular and short deliveries of raw materials which occur from time to time.

These substantial increases in the cost of electrical equipment will tend to postpone the initiation of new electricity schemes, although for the reasons already mentioned they may not retard the development of existing undertakings which can expand from the point of maximum profit downwards to a lesser profit. The start of a new electricity supply is always faced with very poor development in the first years of its life because of the necessity of putting in equipment commensurate with the anticipated load, and then having to await the gradual increase from zero to full anticipated load. A certain portion of the initial capital is non-productive in the first years, but this portion of the investment costs is essential for later development, and although these capital charges are a sheer loss, they have to be met from profits derived later in the development of the undertaking if the benefits of electricity supply are to be given to the burgesses. In such cases it would appear that a viewpoint to be considered is whether the cost to the people of doing without electricity is greater than the expenditure on the projected engineering system.

TURBO-ALTERNATOR COSTS

Another economic rule that may be deduced from the financial and statistical returns of a municipal electric power system is the cost of owning and operating a turbo-alternator. The duty of such a machine is to provide power and energy, and it may be assumed that the equation of cost of production of electricity would contain three elements:—

(a) An element proportional to the power demand and the duration thereof. For the purposes of calculation it is taken that the power output is the maximum continuous rating of the machine and, therefore, the variable component is the hours the plant is in operation.

(b) An element proportional to the energy produced, that is, the units generated by the machine.

(c) An element independent of power and energy from the plant. This quantity is taken as the cost of owning the machine, the investment cost or capital charges which would have to be met whether the machine was producing electric power and energy or not. The cost of purchasing turbo-alternator has increased over the last ten years from a figure of £28,000 in 1938 to £62,000 in 1948 for a 7,500 kw. Turbo-Alternator. This increase, together with the capital charges, is tabulated as under:—

Capital Charges on 7,500 kw. Turbo-Alternator

Year	Cost of Machine	Interest and Redemption Rate	Capital Charges
1938	£28,000	6.125%	£1,710
1940	£40,000	6.25%	£2,500
1948	£62,000	5.75%	£3,560

With these merely suggestive notations as a basis for the three elements it is possible to formulate expressions within designed limitations for the cost of operating and owning a turbo-alternator

Station Load ..... 60,000 kw.

Daily Units 727,000

Daily Load Factor ..... $\frac{727,000}{1,440,000} \times 100 = 50.5\%$

Cost of owning and operating three 20,000 kw. Sets:—

Unit No. 1: 0-20,000 kw. operates	24 hours	per day
Unit No. 2: 20,000-40,000 kw. operates	16 „	„ „
Unit No. 3: 40,000-60,000 kw. operates	8.5 „	„ „
Operation of all Units	48.5 „	„ „

Capital Charges: 3 Units @ £7,360	£22,080
Operation Costs: 48.5 x 365 x £1	17,520
Energy Costs: 727,000 x 365 x $£\frac{0.8}{240}$	276,500
Total Annual Costs	£316,100

Cost of owning and operating four 15,000 kw. Sets:—

Unit No. 1: 0-15,000 kw. operates	24 hours	per day
Unit No. 2: 15,000-30,000 kw. operates	17.5 „	„ „
Unit No. 3: 30,000-45,000 kw. operates	13.5 „	„ „
Unit No. 4: 45,000-60,000 kw. operates	4.5 „	„ „
Operation of all Units	59.5 „	„ „

Capital Charges: 4 Units @ £6,210	£24,840
Operation Costs: 59.5 x 365 x $£\frac{1.7}{20}$	19,010
Energy Costs: 727,000 x 365 x $£\frac{0.57}{240}$	298,000
Total Annual Costs	£341,850

Cost of owning and operating six 10,000 kw. Sets:—

Unit No. 1: 0-10,000 kw. operates	24 hours	per day
Unit No. 2: 10,000-20,000 kw. operates	19 „	„ „
Unit No. 3: 20,000-30,000 kw. operates	15.75 „	„ „
Unit No. 4: 30,000-40,000 kw. operates	13.5 „	„ „
Unit No. 5: 40,000-50,000 kw. operates	8.5 „	„ „
Unit No. 6: 50,000-60,000 kw. operates	2.25 „	„ „
Operation of all Units	83 „	„ „

Capital Charges: 6 Units @ £4,600	£27,600
Operation Costs: 83 x 365 x $£\frac{1.8}{20}$	22,700
Energy Costs: 727,000 x 365 x $£\frac{0.5}{240}$	331,000
Total Annual Costs	£381,300

The operation of three 20,000 kw. sets would be 48.5 hours per day and the total annual expenses £316,100.

In the case of four 15,000 kw. sets which would operate for 59.5 hours per day, the annual costs are £341,850.

Using six 10,000 kw. sets operating 83 hours per day, the total annual expenditure would be £381,300.

From these figures it will be seen that for the load curve shown the machines to be installed should be three 20,000 kw. sets.

DISTRIBUTION COSTS

The cost of generating electric energy is only a part of the total cost of electric service which cost must also include the transmission costs and the large item of distribution. It should be noted that the cost of generating electric power is borne by the consumer whether the generating station is municipally owned or whether a bulk supply is being taken by the municipality from another generating authority. In regard to the costs of transmission and distribution these have risen greatly during the past few years owing, amongst other factors, to the continued installation by consumers of electric cookers, refrigerators, water heaters and radios, and the necessity, therefore, of the distribution authorities to guard their areas carefully against service interruptions and to furnish a good voltage regulation. By early planning a proper distribution system balancing all the variable elements of cost can be obtained, and a selection can be made of the conducting sections of the cables and overhead lines which will give the best transmission costs. For a given voltage the problem is to select a current density in the conductors that will give a minimum aggregate of capital and operating costs.

KELVIN'S LAW

The lowest operating cost of transmission cables is obtained by the application of Kelvin's Law which states that the most economical current density in the conductors of a cable or overhead transmission line is obtained when the annual capital charges on the cable size selected are just equalled by the annual energy cost due to the losses involved in the transmission of that economical current. Besides the economic factor two other factors affect the design and the size of the conductor section. These factors are, firstly, the thermal effects and, secondly, the voltage regulation, but if the economic design is adequate it will usually be found that the cable will carry the load expected without overheating nor will the voltage drop be excessive.

From the financial and economic aspect there are two variables to be considered. One is the increase in purchase price of cable and the other is a variation in the interest and redemption rates applicable at the time the cable is purchased. There has been a considerable increase in the cost of purchasing and installing electric cable. The case is shown in the table hereunder for an 11,000-volt 0.06 sq. in. 3-core cable, which in 1938 cost 9/- per yard or £1,122 a mile installed. In 1948 the price had risen to 25/- per yard and the cost of the installed cable had increased to a figure of £2,988 per mile.

The interest and redemption rates have varied from 6.125% for a 25 year period in 1938 to 6.25% in 1940 then reducing to 5.75% in 1948. The increase in 1940 was due, it is believed, to the financing of the materials purchased for the war.

These substantial increases in the cost of installing or providing the cable for use will affect the economic current density, and the results for the cases mentioned have been worked out.

Year	Cost of Cable per yard	Purchase Price per mile	Cost of Installing per mile	Total Cost of Cable Installed	Interest and Redemption Rate	Capital Charges per annum	Economic Current amps
1938	9/-	£792	£330	£1,122	6.125%	£69	58.3
1940	11/6	£1,020	£381	£1,401	6.25%	£88	65.8
1948	25/-	£2,200	£788	£2,988	5.75%	£171	91.8

Analysis shows that the economic current density of 0.06 11,000-volt cable has increased from 58.3 amps. in 1938 to 91.8 amps in 1948, consequently in order to run economically at the present time a higher working rate for the cables is justifiable.

The short table given hereunder shows the current density related to the thermal heating effect allowed as a maximum and the usual rule of thumb reference of 1,000 amps per sq. in., from which it will be seen that the economic current is well below the heating effect reference:—

Year	Economic Current Density	Heating Current Density	Reference
1938	973 amps/sq. in.		
1940	1,090 amps/sq. in.	2,410 amps/sq. in.	1,000 amps/sq. in.
1948	1,530 amps/sq. in.		

CONCLUSIONS

(a) Electricity supply systems which are begun during this period of high prices will tend to initially operate at a loss for a much longer period than previously.

(b) Older undertakings which were financed when prices were low can be profitably developed during this period of high prices because of the fact that the capital expended in development will be a much smaller proportion of the total system capital expenditure. However, if high prices continue then the surpluses to be expected from the older established undertakings are bound to decline.

(c) Due to the increased capital charges of turbo-alternators the cost of owning a turbo-alternator will be substantially increased.

(d) On account of the increase in price of cables it is now permissible to increase the current density of operation to a higher figure without infringing Kelvin's Law.

Finally, it is realised that little purpose is served by setting theoretical standards which are difficult of attainment on account of practical and financial obstructions encountered, but it is hoped that sufficient has been shown to indicate that true economy in engineering consists in financial selection based on academic and practical grounds. It is not sufficient to be parsimonious and to retard development on account of high prices of equipment.

PRESIDENT:

Thank you Mr. Giles for your most interesting Paper. I am sure you will have all found this Paper most interesting and, as I said earlier, it will be a valuable contribution to the Proceedings of the Association.

As we all know, the slight increase in cost of electricity, as shown in the various tariffs of the present day, is not by any means in proportion to the increased cost of plant, labour and material, which subject has been very ably expounded by Mr. Giles in his Paper; therefore it behoves every engineer to watch very carefully the financial position, the conditions of supply and the tariffs levied by his Municipality.

The Paper, now madam and gentlemen, is open for discussion.

Mr. MILTON, Electricity Supply Commission:

Mr. President, may I through you, Sir, congratulate Mr. Giles on an able and valuable Paper.

We are aware that the prices we are now paying for plant and equipment are much higher than pre-war prices. There is, however, an undercurrent in the author's Paper which gives one the impression that he expects a drop in price levels. Whilst I think we all expect a drop in price levels, I personally feel that that drop will not be a material one for a long time, if at all. Those of us who have been responsible for, or who have taken part in the purchase of plant in the past—and I refer more particularly to generating plant at this juncture, have been used to paying very low prices per kilowatt of plant installed. If we studied the equipment prices of that plant in the country of origin, it would be noticed that some very remarkable facts emerged. Speaking from my own personal experience I might say that certain plant was actually purchased, delivered to this country, installed and set to work at less than the cost of identical sets delivered at the same factory of origin in Great Britain. It is clear, therefore, that this country (which may have been somewhat unique in this experience) has had the benefit, in the past, of plant delivered, at extremely low prices. The reason, I think, is obvious, i.e., that the precedent created by the quotation of the low prices in South Africa was not one which perturbed the manufacturers, because the number of repeat orders likely to result from those low prices was not of such magnitude as to disturb the manufacturing capacity of the tenderers. In other words, I have the feeling that this country's requirements were used as a "fill-in" for available manufacturers' machine output.

That day, I think, has passed. This country's activities are extending and expanding very rapidly, and the quantity of generating plant we are installing is becoming so appreciable that I submit manufacturers must have regard to future demands, based on present precedents, when quoting for plant to be delivered to South Africa.

For the aforesaid reasons we would be wise to face the probability that price levels are not likely to fall materially, unless we run into a period of depression to which Mr. Ritchie referred recently as time considered appropriate in some quarter for the introduction of the Meter Code. I do not think we should adopt restrictive measures now in the hope of a depression when planning our future with the idea of keeping total capital investments down. Such planning may even be the cause of that depression which we all hope to avoid. In view of the high prices now ruling, it is necessary that we should analyse the development costs of existing undertakings and the cost of new undertakings carefully.

The author has envisaged a system of examination plant and equipment on a price standard. I would suggest that the author has not gone quite far enough in dealing with the subject, probably due to the time limitations set by your Executive, Mr. President. When considering the economics of plant, in my opinion it is not sufficient to study the analysis of working costs on the basis of a chosen year's figures. In view of the rate at which this country is developing, plant purchased today is not likely to be running and operating on the low factor of hours per day used by the author as a basis, if we consider the position in say, ten years' time. The analysis presupposes, however, that operation will continue on the same basic hours per day. Plant which was purchased 15 years ago is in many instances, the stand-by plant of those stations in which it was installed. That is the general experience of conditions in this country in municipal organisations.

Plant installed for factory application may be placed in a different category, because in such cases you are dealing with "units of output."

From these points of view, therefore, the extra capital invested for purposes of obtaining higher efficiency should be studied on a shorter period than the "loan period." The extent to which the period must be reduced will depend on the probable rate of development of the undertaking and the probability of new sets today becoming stand-by in the near future.

As regards new schemes, the author has rather indicated they should be left in abeyance to be studied at some later date when the price levels fall. From what I have just said it should be clear that, in my own view, such postponement will do no good. In most new schemes, one does not expect the immediate return to cover cost. One should, therefore, plan such schemes to become, shall we say, "cost bearing" some years after the inception. The tariffs for new schemes must necessarily be higher than the tariffs used in the past for new schemes, and for this reason it may be necessary to postpone the inauguration of a new scheme. That postponement, however, would not be based on the probability of the reduced cost of plant installation or of operating costs, but on the possibility that the town or district to be supplied by the new scheme will have developed to an extent where the greater sales potentiality will bear the increased cost. Mr. Sibson's comments on the value of the penny, made at the Durban conference, would bear repeating.

Coming to somewhat more detail, the author has given us a statement of a formula which represents the cost of owning and operating a plant, that formula being divided into A plus B time hours plus C times the units turned out. I think, Mr. President, that the paper would be increased in value if the author would give some indication as to how he arrives at the figures A and B. One is led to assume that A represents the yearly capital charges and that B is some allowance for the depreciation of the set. If that is the case, then B is a difficult figure to arrive at, from the point of view that sets which are stopped and started with great frequency will require a higher allowance than sets run for long continuous periods. The frequent stopping and starting of turbo-alternator plant is not conducive to low costs.

In connection with the application of Kelvin's Law to the problem of costing losses, costs may be assessed either from the point of view of the "additional cost" of furnishing those losses to the system or alternatively on the basis of the additional cost plus the absorption of plant capacity. In the example the author has quoted, I think he used the figure of .3d. per kW. hour for his variable, being the cost per unit generated; on that basis it may be that the additional cost of additional units comprising the losses may be .25d. per unit, and the cost of the losses may then be calculated as .25d. to arrive at the optimum size of a cable. If the losses are to be charged for potential absorption of plant capacity, it is necessary to bring in some kW. charge. In a case such as the author has quoted the effect on the majority of cable systems of introducing a demand charge for losses would probably be to more than double the cost of those losses, with the consequence of a very large change in the permissible optimum loading of the cable, considerably affecting the choice of the cable size.

PRESIDENT:

Thank you Mr. Milton for your contribution to the discussion. I am sure Mr. Giles will be only too happy to reply before Congress disperses. Any further discussion?

Mr. ANDREW, King William's Town:

Mr. President, may I add my compliments to this Paper by an old colleague of mine; I have known Mr. Giles for many years. It has given me pleasure to hear his Paper and to add my thanks to his efforts.

The element of cost is the main point that occurs in the Paper. In the examintion of costs and in weighing up whether it is worthwhile to carry out a scheme or not, one is continually faced with the problem: will, and if so, when will costs come down. Now it is my opinion that there might, due to some stabilisation in the law of supply and demand, be some slight reduction in prices but, nothing which should influence a decision on the project in view.

In support of this view, in the Paper we have a table showing us a comparison of various costs; i.e., the percentage

increase between present and post war costs under the various headings (A) to (D).

Except for (A), which is the basic rate per hour for manufacturing the finished article, the remaining headings can be further subdivided and these subdivisions will consist mainly again of wages. For example take (B) Coal or (D) Raw Materials; the percentage increases shown would, on analysis, be due largely to increase in wages and would even include increases in Social Security payable to or on behalf of employees engaged in mining these raw materials.

In other words the cost of the finished article, particularly heavy engineering plant, is made up very largely of wages; the cost of raw materials as such is only a small percentage of the total cost. Take for example a motor car costing £800; it is probable the value of raw material used in the construction of the car does not exceed £80. The rest is wages, profits and dividends, etc. This high proportion, in relation to total cost, of wages is paid to a large number of employees, engaged on a multiplicity of operations, and one arrives at the fact that unless wages are reduced, which is not probable, there can be no substantial reduction in cost of machinery and plant.

The other point is on the matter of selection of cable sizes. The author has dealt with the application of the economic law for cable selection and quoted the wellknown authority, Kelvin. But in addition to this we must always consider the other factors, besides the cost of losses which Mr. Milton has mentioned, namely, that whereas economic considerations determine the optimum size of cable conductor, it is thermal consideration, normal current and short circuit current, together with permissible voltage drop that fix the minimum size of conductor.

I have had experiences of short circuits occurring on cable conductors, which have been too small to cope with the short circuit current. Under such conditions, besides being faced with the inconvenience of renewing a considerable length of cable to effect immediate repairs, steps should be taken to ultimately replace the cable.

PRESIDENT:

Thank you, Mr. Andrew, for your contribution.

Mr. SIBSON, Bulawayo:

This Paper, Mr. President, amplifies a little further the very valuable contribution we had in Durban last year on the subject of post-war prices. I said then, and I say again, that it is time we stopped talking about the rise of prices and began to think about the drop in value of the £. We still think in terms of the penny per unit or ½d. per unit, being something that we used to be able to sell electricity for before the war, and we seem to regard it as essential that these figures should not be exceeded. We seem to regard ½d. per unit as an ideal to be aimed at, whereas in fact we are not talking about the same thing. The pre-war ½d. no longer exists, the pre-war 1d. no longer exists; we are talking of a penny that is not worth 1d. and never will be worth 1d. again, and we should, I think, face facts, and the situation which now presents itself, forget all about what things used to cost before the war, and base our economic considerations on what things really are now and what they are likely to be in the future.

I, therefore, agree with Mr. Milton when he expresses what would seem to be a pessimistic view, that the cost of plant is not likely to go very much lower than it is now. Anyone who thinks that we are going to get anywhere near pre-war levels in the value of plant ignores the whole question of the real meaning of money.

With regard to the effect of the various price changes that have taken place in the last few years, I would like to submit the following information in regard to the Bulawayo Undertaking, as representing the state of affairs in a growing undertaking where a portion of its outlay is in

respect of plant purchased before the war, a portion in respect of lant purchased during the war, and a portion in respect of plant purchased during the last two years. Looking at my complete revenue and expenditure account, I find that Native labour has gone up by 11.5%; coal has gone down by .5%; water has gone down by .82%. Overall loan charges on capital equipment have gone up by 25.8%; European wages have gone up by 25.08%; other municipal charges—largely other departments—have gone up by 25%; the price of all materials used in the distribution department, normal routine line materials, transformers, cables, etc., taken over the whole average has gone up 85%, and I am sorry to say the contribution to the rates has gone up 400% giving a total increase, over the whole range of activities of the department, of 25.28%. That is in respect of the year 1947 compared with the year 1939. It shows that while these enormous increases in plant prices are now being faced there are undertakings who, at the moment, are benefitting by the plant already in existence and which was purchased at lower prices, so this figure of 25.28% additional increase is not one that I expect will be maintained. I merely give these figures as a matter of interest to the meeting this morning to show that this overall increase of 25% on annual expenditure has to be met, and it is no good trying to avoid tariff increments. They have got to be introduced for we have to meet this expenditure somehow, and it is no good putting it off any longer. We must all face the fact that tariffs must go up.

I have one or two other comments on the Paper. In connection with the methods the author suggests for deciding on the size of generating sets, I think in general there are quite a number of other considerations to which he has not made reference that are just as important as those which he has mentioned. He commences with a load curve of an undertaking as a basis, and at the same time assumes that no plant as yet exists. That may be correct, if we are dealing with the large undertaking where an additional station is needed to deal with specified loads and load factors. In actual experience, a station usually starts with comparatively small loadings, and so in fact we cannot use the rather simplified method that the author suggests for deciding how big our sets are going to be, unless our initial load is of such an order that the first set will be the same size as all subsequent machines. There are other considerations, too, Mr. President. We cannot ignore the tendency towards standardisation which is taking place in England, particularly where that standardisation is related to steam conditions, and the first job of a designer of a new station is to settle his steam conditions, and that does play some part in the decision with regard to the size of the machine, for he has to bear in mind the standardisations which have been effected so far as turbines are concerned.

For those interested in larger stations, the Engineer, too, has to remember the capacity of the S.A.R. to handle Alternator Stators, and I think that limits us to about 35MW—perhaps I am wrong, but that used to be the position.

Another point, Mr. President, is—I am wondering whether it is right to accept a load curve such as the one indicated in this Paper and then design a station to meet it. Is it not better that we should endeavour to change the shape of the load curve? That is a subject that has frequently been discussed here, and I suggest that we should not entirely ignore the possibility of an improvement of load factor which can perhaps be brought about and which, of course, would alter the calculations the author has suggested as the basis for the size of sets.

Only one other comment in respect of the design of cable systems; the majority of cable systems installed from the point A to point B to carry a given load require nowadays to be duplicated. Now each of those independent routes must obviously be designed in such a way as to be capable of handling the maximum load. It must be technically capable of carrying that load. When it is duplicated it is obvious that the system is normally

very much more than technically capable of carrying that load, and the final result bears no relation to Kelvin's Law at all. The application of the Kelvin Law would give results lying somewhere between the capacities of a single and double cable route, so that the final design factor today, I suggest, is based on availability of supplies, which almost invariably involves the duplication of cables, together with the necessary technical considerations concerning regulation and the thermal capacity of a single route to carry the whole load.

Mr. FRASER, Johannesburg:

Mr. Chairman, did I hear Mr. Sibson correctly? Did he say that his cost in rates had gone up 400%, or his costs to the relief of rates had gone up 400%.

Mr. SIBSON:

Perhaps I should quote the exact figures, which will make that look a little less drastic. We have never done a great deal of contributing to rates in Bulawayo, and in 1939 the amount was only £1,000.

Mr. EASTMAN:

I congratulate Mr. Giles on what I found to be a very interesting paper.

There are two comments I would like to make on it. They relate to the figures to which he refers and the cost of materials and plant. As the Paper refers also to the use of plant after having purchased it, I suggest that we should not overlook the fact that there is an important tendency in this country for the cost of labour also to rise very rapidly. When contemplating the future development of an undertaking and in particular, the costs of production and distribution in relation to the tariff of charges, we must not overlook the fact that whilst our labour costs are continually increasing under present day conditions, there is the possibility of our being faced at no distant date with the burden of a 40 hour week, for which there is a strong agitation going on in this country in respect of all industries, including the electricity supply industry. I would refer also to the conclusion by the author of the Paper and submit that the ploughing back into the undertaking while times are good of as much of the gross profit as possible is (provided that the tariff rates are not unreasonable), a most valuable and important insurance against many difficulties which will arise in the future in purchasing plant at the very much higher prices that will prevail for many years to come. It is a theme which we have discussed in this Convention, year after year, and we are now seeing clearly all those things happening which we said would happen in the case of those undertakings who have not taken a strongly conservative view of the finances of their undertaking and who are now finding difficulty with their ratepayers in embarking on expenditure for necessary extensions of their undertakings.

There is one way in which the tendency of costs to rise may be counter-balanced to some extent, if not completely, and that is to bring about rapid expansion of the undertaking by employing all means open to it as an authoritative and influential body in the district served by it to encourage the more and more extensive use of the service. If the development of an undertaking is left merely to the casual or fortuitous efforts of the electrical trade as a trade, it is obvious that sunc unco-ordinated effort will not produce anything like the results obtained by the undertaking itself taking those steps. By this means only can the tariff rates be kept at their present-day level and then only because the expansion of sales of electricity takes place at a greater rate than the increase in the working costs, particularly in regard to capital costs. If the costs and tariff rates are not kept within reasonable bounds, such difficulties may arise as to prevent the undertaking expanding at all.

Mr. MULLER, Bloemfontein:

Mr. President, Gentlemen; I would like to add my thanks and appreciation to Mr. Giles for his Paper, which is of great

interest to me. It has given me an opportunity of listening to some very interesting discussions on this subject which I feel will be of very great personal use to me.

Most of the points I had some queries on, have been touched on and I will, therefore, get replies to them from Mr. Giles, I presume, during the proceedings. There is only one point, I think, that has not been touched on; in deciding on the size of sets, it does not appear that Mr. Giles has considered the question of stability of supply. For instance, on actual calculation if you follow out the curves of the A, B and C combinations you will find that a 60,000 kW set would be the cheapest of the lot, but you could not operate a station with one 60,000 kW set.

I don't notice anything in the way of plant out of commission, which you must have and which must be a charge on the undertaking.

PRESIDENT:

Thank you, Mr. Muller.

Cr. ERASMUS, Port Elizabeth:

Mr. President, as a mere layman I apologise for interceding by quoting "Fools rush in where angels fear to tread," but after some very recent experiences I don't consider engineers as angels! I cannot compliment the author on his Paper because I still know little of the technical details but there is the practical aspect from the point of view of the Municipality of Port Elizabeth which makes this Paper of particular interest.

Mention has been made here that the only way to offset the increased capital cost is by levelling your load factor, but I am afraid in a town which is developing very fast industrially that is becoming more and more impossible. Our industrialists are maintaining day schedules as our American industrialists think South African labour is highly inefficient at night time, and they are concentrating their working hours into day light, the result being that our load factor, we have no traction load, is concentrated into certain hours in the morning and we have to provide accordingly. All consumers have to pay for the increased costs caused by the provision of plant for peak loads and, I think, the author would be well advised if he would touch on this aspect and how these capital costs can be offset. Tariffs are due for revision, and as loads cannot be evened I fear the tendency will be higher tariffs. We shall have to prepare consumers for what seems to be inevitable, at least in a semi-industrial town like Port Elizabeth.

PRESIDENT:

Thank you, Cr. Erasmus, for your contribution. I think you have voiced the feelings of many of us here. I agree with Mr. Sibson that we have lost sight of the value of the £ today and consequently we are inclined to make wrongful comparisons.

Mr. GREEN, Victoria Falls and Transvaal Power Co., Ltd. and representing S.A. Standards Institute.

May I add my congratulations to Mr. Giles for his Paper on a very important aspect of electricity supply.

Mr. Muller has brought up an aspect which occurred to me regarding the running of a station, and I feel that Mr. Giles should have recommended four 20 kW sets instead of three to provide for one being out of commission. However, I think load factor has a bearing on this, as most supply engineers strive for the highest possible load factor. I wonder whether there is not an economic upper limit to load factor, because one can do a considerable amount of maintenance work during the short time the machines are shut down during the off peak periods and, in my opinion, about 75 per cent. is the economic limit. If you go above that you will increase the cost of generating plant considerably, so that it might be some consolation to Cr. Erasmus if his load factor does not increase very materially.

Mr. Giles has mentioned, I think, what is the most important point of the whole subject, and I would like to suggest that it applies to every undertaking. The electricity supply from a municipality is based on the principle of service, and every supply undertaking should be operated on this principle of service to the community, and as such, we should supply power as cheaply and as efficiently as we can. This brings us to tariffs, and in encouraging the use of supply, I don't know whether I agree with the principle of a very low unit charge and a high standing charge. I think there should be a reasonable balance and I was very interested in the relationship of the figures mentioned by Mr. Giles. Taking a 20,000 kW set with a fixed charge of £7,360 plus 20/- per hour plus 0.25d. per kW hour and assuming the set runs continuously throughout the year, it would bring the fixed charge to something like £16,000 or 16/- per kW hour which is roughly 1/4d. per kW per month. In other words the cost of generation is 1/5d. per kW plus 0.25d. per unit and the tariff should be on an equivalent basis. I think there is a tendency sometimes to increase the kW charge to too high a figure.

PRESIDENT:

Is there any further contribution to the discussion before we adjourn for lunch?

Mr. McDONALD, Pietermaritzburg:

Mr. President, a point has occurred to me. We had a Paper yesterday on the distribution of electricity, and it seemed to be generally accepted that when electricity is carried to new areas, those areas should either pay for the cost of the extension, or at least contribute substantially towards these costs.

Today we have had a Paper rather on the other side of the matter. It refers to extensions of generating plant. Generating plant extensions are usually required because of industrial developments—a factory may come to a town and add say 2,000 kVA to the town's maximum demand.

We have yet to hear it suggested that the factory should contribute to the capital costs incurred by the undertaking in supplying this extra maximum demand.

Now, I am optimistic myself on the tariff question. I think that we are going to get through without altering too drastically the present level of tariffs. But there is one policy which, if not abandoned, may look like crippling the supply industry. To attract industries, too many towns have been offering electricity at ridiculously low tariffs. Today many undertakings are supplying electricity at ½d. per unit to industries with most objectionable loads—with bad load factors and worse power factors. With the growth of industry these industrial loads have taken charge, and the undertakings are left with no control at all.

We should change this policy; industry should pay a fair charge for electricity. We should try to make industry bear the true cost of its supply, instead of accepting blindly as a principle that we must supply industry without any profit at all.

If we altered our attitude there, I think we could carry on as we are in spite of present-day high capital costs.

PRESIDENT:

This subject of tariffs is, of course, a very thorny one and probably at the next Convention we may have a Paper on tariffs. To frame a tariff to meet every case is difficult to formulate.

We will adjourn for lunch and resume at 2.30 p.m. I propose at 2.30 p.m. to deal with the Meter Code.

The Convention adjourned at 12.30 p.m.

The Convention resumed at 2.30 p.m.

PRESIDENT:

Ladies and gentlemen, I propose we commence with a continuation of the discussion on the Meter Code. You will recollect that it terminated this morning

with Mr. Clarke and Mr. Ritchie giving us an explanation of this subject. I presume there are many points that delegates wish to raise with Mr. Ritchie and Mr. Clarke and the matter is, therefore, now open for discussion.

Mr. NICHOLAS, Umtata:

Mr. President, I would like to hear the origin of this proposal and the reasons for it.

Mr. RITCHIE:

I presume by "origin" you mean the request for a Meter Code? The request came in the first instance from the Municipality of Pietermaritzburg and also the Institute of Electrical Engineers—I am speaking from memory and it is more than two years now—and the Council went into the matter and decided that there was a need for such a Code.

PRESIDENT:

Thank you, Mr. Ritchie.

Mr. MILTON:

Mr. President, there were one or two points that have occurred to me which, I think, are of considerable importance. In the first place there are a number of meter testing installations in this country which are operated by the various supply authorities; the Commission for example, has meter testing equipment on its undertakings and there are certain municipalities who also have meter testing equipment. It has occurred to me that, in dealing with the amount of money which is required to be spent on the establishment of the A and B stations in order to get the Meter Code working, no account has been taken of the availability of certain equipment which would not be incorporated in the actual stations which have been mentioned. For example, the Commission has a certain amount of equipment at Witbank which is not one of the localities for the establishment of an A or B station. I feel satisfied that much of the equipment at Witbank might be incorporated in either an A or B station with consequent reduction in cost of new equipment to be purchased to establish those stations effectively.

Perhaps the Bureau could get in touch with the supply authorities and find out whether they have equipment which could be so incorporated, and whether they would be prepared to dispose of it. It may seem rather serious to suggest that a supply authority should dispose of any meter testing equipment of that nature, but on the other hand Mr. Clarke has made it very clear that the co-ordination of testing is desirable in the interests of the saving of money to the country as a whole. Bearing in mind that such testing is likely to become compulsory, co-ordinated mutual assistance seems most desirable in the individual as well as the national interest.

There is another aspect, however, which I don't think has been dealt with quite satisfactorily. We were informed of the number of containers for the safe transport of meters between the point of application and the point of test. Speaking, of course, from the Commission's point of view—I have no authority to speak from any other point of view—you will recall that I mentioned the very large number of rural consumers supplied by the Commission. To that number of rural consumers must be added a number of ordinary township reticulation systems which are not on a railway system. If all those meters are to be tested they must be subjected not only to the normal handling by rail but must be sent to a central store to be distributed into the country and it seems to me that the number of containers for safe transport of meters will be greater than has been estimated by Mr. Ritchie. Furthermore, it is difficult to say whether or not the containers proposed would be suitable for rough cross country transport.

As regards the "cost per meter" of the tests, the figures seem rather high in relation to the cost of the actual meters themselves, but whether or not those

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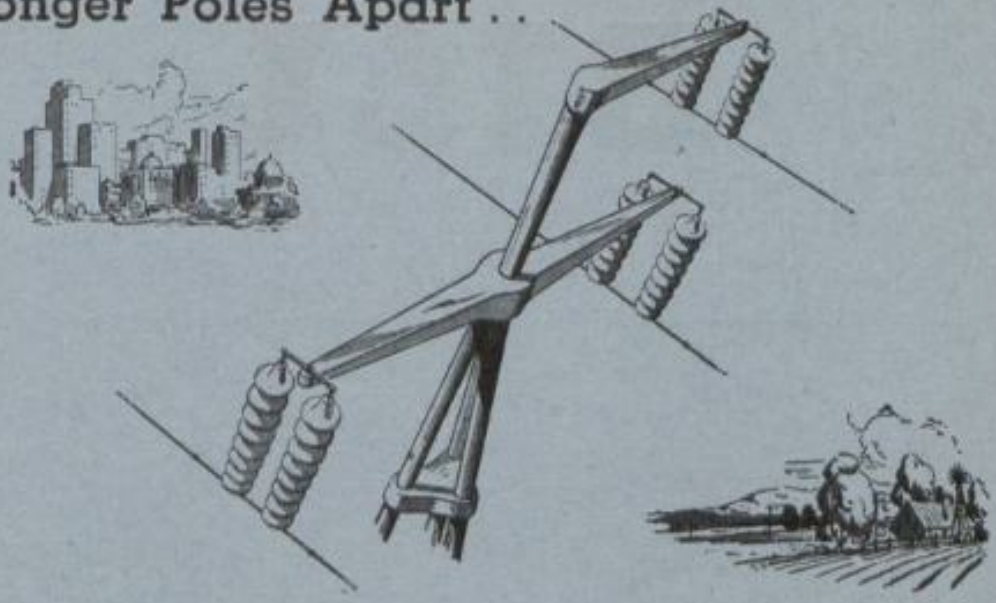

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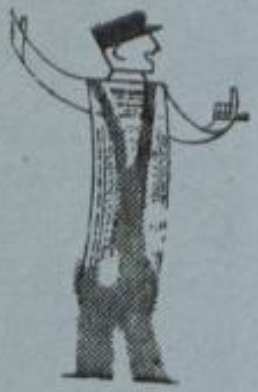

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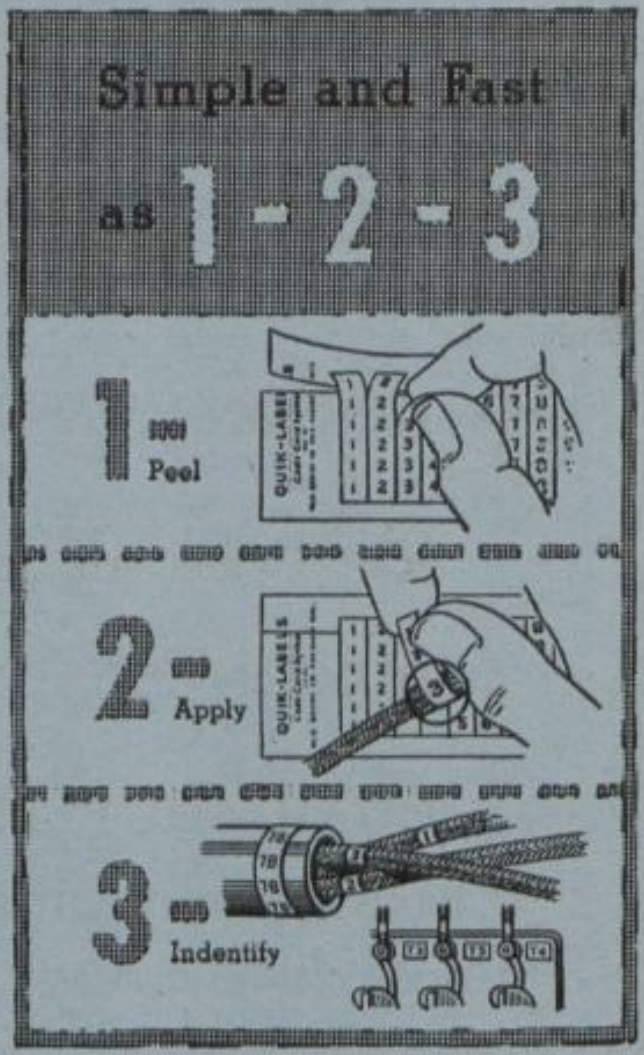

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costs could be reduced further in application is a matter which only experience will disclose. It seems therefore that, notwithstanding these high costs, if we support the principle of maintaining meter accuracy on an electricity undertaking, we will have to study every aspect which may lead to a reduction in the cost of testing and handling. I feel confident, however, that those costs quoted must be reduced in time, because they are almost comparable with the purchase price of new meters!

PRESIDENT:

Thank you. Perhaps Mr. Ritchie will reply to the points raised?

Mr. RITCHIE:

Mr. President, with regard to the first point, that is the use of equipment, it is an excellent idea. Where, however, certain medium sized towns have already equipped themselves with the necessary station and equipment they may continue to test their own meters and assist their neighbours. The scheme outlined this morning is merely a suggestion. The Bureau will have to work out the details as it goes along. It feels that the scheme is a feasible one and there should be no difficulty in putting it into operation, but it is suggested that equipment should be concentrated in the main centres.

With regard to the country and railage arrangements, while there are certain towns off the railway lines, a mobile van could well serve quite a large area in that respect and I don't think the meters would suffer undue damage if they were correctly hung in the van.

With regard to the box question, the Bureau went into that thoroughly and has made adequate provision. The cost does not entail the bringing in of the meter and testing it and sending it out again; this cost includes dismantling, overhauling and then testing and sending the meter out, but the meter is as good as new again when it goes out.

Mr. MILTON:

One point I raised previously, I may not have made clear. In arriving at the cost per meter, I think Mr. Ritchie and Mr. Clarke stated that the estimated cost was based on the testing of all meters at these centrally located meter testing stations and one presumes that, with the fixed overheads of such stations, if the number of meters tested is reduced by the continuance of the practice of testing of meters by the local supply authorities, the cost per meter will be considerably increased. That is why I suggested that local stations might be moved to the main stations rather than that they should continue to be used in their present localities to test local meters.

PRESIDENT:

Have you any comments on that Mr. Ritchie?

Mr. RITCHIE:

No, Sir.

PRESIDENT:

A point occurs to me: we have dealt with the word "testing." I suppose that any supply authority that sent meters to you for testing and you found their bottom jewels wanted renewing, the charge for that service would be added on and the client would still have to bear "on costs" on top of the charge for renewals?

Mr. RITCHIE:

They do not test unless specially asked; the centres will do their own meters; the Bureau is only there to check up to see that they are properly done.

Normally, all "off service" meters would be stripped, examined and generally overhauled. Costs for this work are included in the figure quoted by Mr. Clarke. Any parts replaced would be charged to the owner of the meters, preferably at cost price.

Mr. EASTMAN, Cape Town:

This subject is one of the most important that has come before us for some time, affecting as it does the registration of that which is the principal source of our revenue and the quality of our service as visualised by consumers.

I recall that a good many years ago a Government Department, I think the Department of Assize, proposed to take over the assize of electricity meters. I think that finally the proposal fell through on the grounds that electricity was a *service* and not a *commodity*. We as an Association, did not favour the intervention of a Government Department in this matter although we realised the desirability of the introduction of measures to make for accuracy of registration. The Standards Bureau is not a Government Departmental organisation but is a body with interests similar to ours, and their proposals in connection with this matter are, I think, worthy of our support, the more particularly because from the figures given to us this morning there must be between 150/250,000 meters in this country which are not being tested at all before being installed and very seldom tested afterwards. Mr. Ritchie might, perhaps, confirm my estimate but he told us that between 4 per cent. and 5 per cent. of the municipalities own 90 per cent. of the meters. These large municipalities are probably the only concerns who have testing equipment. If my understanding of the matter is correct then a very great need is indicated for seeing that the position is rectified. I feel, therefore, that provided electricity undertakings which carry out the testing work for the Bureau are reimbursed any additional expenditure to which they are put, this thing should have our whole-hearted support.

PRESIDENT:

Thank you.

Mr. FRASER, Johannesburg:

Mr. President, Ladies and Gentlemen; first of all I would like to congratulate Mr. Ritchie and Mr. Clarke for the lucid manner in which they have explained the various functions of this proposed Act.

I would, however, suggest, Mr. President, that it would have been far better if the remarks made this morning had been submitted in writing before the Convention sat so that we could have come prepared to discuss the points in detail. Though I am closely associated with the working of the Bureau, a good many of the suggestions made this morning are entirely new to me, or, may I say, they have been put in such a way that they look new to me, but I may not have perhaps grasped the points made by the speaker.

One must ask why has this been brought about, and, brought about so suddenly on most of the undertakings. I feel this morning, after listening to the lobby talk during tea interval, that though most of us knew this was coming about, the steps which have been taken have come as a bombshell to most of the smaller municipalities and one is asked why the proposed Act is necessary. If it is a fact that the larger municipalities own the largest number of meters, has the country found it essential to institute a form of check upon those municipalities? I would like that question answered—why has the proposed Act been necessary?

I think on the whole, as Mr. Eastman says, we, as an Association, should be a party to such an Act. In a young country like this, however, one always looks for further information as to what has taken place in other countries, and, I find that a similar Act was passed in Great Britain but never really tried out. It had little support just before the war broke out and then the whole measure was kept in abeyance until the war was over. I don't know whether we can take that information to show how unimportant it is to be rushed through the Bill at this stage.

Prior to today I thought the Johannesburg Municipality was one of the largest users of electricity meters in the country but I don't find Johannesburg quoted amongst the 12 areas in which meters are to be tested. It may have been put in

such a way that I did not grasp it properly, but, I understood Johannesbury Municipality would test their own meters and the figures given to me by my staff are somewhat different to the figures given by Mr. Clarke this morning. Mr. Clarke quotes an additional expenditure of £12,000 which he thought would be sufficient to meet the requirements for the new testing arrangements. For Johannesburg alone, however, my staff gave me figures of £10,250, so some of us have gone wrong; this could have been checked had we received the notes beforehand.

According to Mr. Clarke only five more meter instrument mechanics are required for the whole country to meet the new requirements, but I am told Johannesburg itself would require five or six additional men. There is also the very important question as to whether the same authority responsible for the Act will make it their business to alter the Trade Union principles in this country so that we can employ girls where at present male mechanics are employed. On the Rand the Trade Unions are fairly strong; they do look after their own members and I can imagine that it will be very difficult unless we get some backing from the Government to replace meter mechanics with girls. It is done in other countries, I know.

The question of transporting the meters to and from the test point has been dealt with by Mr. Muller and Mr. Eastman, but I wonder what the meter would look like or how correct it would be after it had gone over 150 miles of the railway and rough roads.

I am convinced that the proposed Act is a good thing and may be essential, but, I would far rather see it put back until such time as every municipality has had an opportunity of investigating the requirements together with the expense involved in operating the Act. Further, can we get the additional meters required, because if you take a meter down for test it must be replaced pending the completion of the test. I feel there are far more important things to be handled with the limited staff we have at the present time than instituting a Meter Code. I don't say we should delay it too long but I do think we ought to delay it sufficiently to give us an oportunity of going into the various points. On that score, Mr. Chairman, I would like this Association to test the feelings of members and give the Bureau some guide as to whether they are in agreement with such a Code being referred back for about 12 months or two years.

PRESIDENT:

Will you reply to the points raised by Mr. Fraser?

Mr. RITCHIE:

Mr. Chairman, I think it is hardly fair to say that the Code has been introduced suddenly. Nothing has been sprung on this Association. It was discussed at your Conference last year and then only as a result of the interest shown by the various municipalities. The Bureau explained last year that it would probably have the Code finished in nine months, but it has taken a year to do, so there is no suddenness about it and I don't agree that it is a bombshell. Everybody knew more or less from the beginning that the Bureau was reducing the error allowed to plus or minus 2½ per cent.

The position in South Africa is that there are 400,000 meters, of which less than 200,000 are being tested regularly. Some have been installed for 20 to 25 years. If the consumers got to know these figures they would feel quite happy.

With regard to taking our lead from other countries, if there is any country hard pressed for labour, capital and all the other pleas that have been put forward for the delay of this Code, I think it is England. They brought out this Code in 1936; on the outbreak of war, it was shelved, but England has seen fit to start work on this and re-introduce it. The late Mr. Richards, the Commissioner, told me that the position with regard to meter testing in certain parts of England was chaotic.

The use of electricity in this country is increasing rapidly and if we delay the Code unnecessarily and make it more difficult for ourselves, I think that would be a very foolish way to go about it.

I regret that I did not mention it this morning, but Mr. Clarke has mentioned it; our figures did not include Johannesburg and the £12,000 was for the rest of the country. Mr. Clarke will probably deal with Johannesburg and its difficulties later.

With regard to girls, I am afraid I cannot offer any assistance. The Bureau is not a Government Department and it does not have anything to do with labour, so I am afraid I cannot assist. I only made a suggestion because overseas girls are employed to do this work.

In connection with the suggestion that the Code should be delayed for two years, as I said this morning, if the Code is promulgated tomorrow you will have still two years before you have to test meters and after that only 20 per cent. increase up to six years, so you have eight full year in which to do this job.

As to the supply difficulty, I heard only yesterday that one of the members here had no difficulty in obtaining all of the necessary meters for his stock so that he could carry out the necessary tests.

Mr. CLARKE:

Mr. President, since I was responsible for putting this Paper before you this morning I would like to apologise for not mentioning Johannesburg, but the reason for that was purely and simply because Johannesburg, I believe, has 90,000 meters on its system, and in order to test those meters, under their present method of working they would be fully employed and could not be made use of to bring in meters from other towns. Furthermore, during the next ten years it is quite probable that Johannesburg's total number of meters will increase at the rate of perhaps 13 per cent. per annum at least, so that by the end of 8 years they should have something in the order of 120,000 or 130,000 meters and I do not feel that it is right to put any more work on the Johannesburg undertaking. I do apologise, Mr. Fraser, for not mentioning that before.

Mr. FRASER:

Thank you, Mr. Clarke. It has eased my mind because I thought I had to go to Germiston to get these 90,000 meters tested.

Mr. BRADLEY: Port Elizabeth:

Mr. President, the meter code test law has given quite a lot of concern down our way in Port Elizabeth area and to Port Elizabeth particularly, because not only does it mean that, according to the information given me by the Meter Department, our requirements would be somewhere in the vicinity of six to seven thousand pounds for testing aparatus but I would have to get a new site and a new building, and I am now glad to have my good friend here, my Councillor delegate, because when I put it to him that I want a few thousand for buildings he will know why.

The point, Mr. Chairman, is, I think, if we are to do a district—South East and Central Province is our scheduled area according to Mr. Clarke—and I understand, any municipality within those areas which now test their own meters will retain that facility. I think that the cost of testing and certifying any one meter will increase considerably in our area and I don't know how we will get our money back on the capital expenditure incurred or how my Council will view the spending of so much money at this time. While I agree we should encourage this, I feel that a delay in this matter for 18 months to two years would be feasible.

Mr. KINSMAN, Durban:

Mr. President, we have heard that this country is as electrically minded as any country in the world. We pride ourselves that we are in the forefront of electricity. Sales of electricity in this country are generally in the hands of

municipalities and I hope I won't be misunderstood by the other purveyors of electricity when I say that they—the municipalities — have set a very high standard. While we pride ourselves on our efficiency and the accuracy of the calibration of our meters, one of the things we must do is to develop a sense of confidence and trust in our consumers and until there is an independent standard by which meters are calibrated I fear the consumers will, as in Stellenbosch, say "Watch them." And to justify our claim to be in the forefront in the distribution and sale of electricity, while we may have our own individual views on this proposal as a general scheme, we should welcome it and I don't think we should appeal for further delays as has been suggested.

These costs of testing plants are large amounts on their own, but relatively speaking are they large amounts? The centres suggested under the A and B class are today asking their Councils for from £50,000 to £200,000 a year. Against these amounts the cost of testing plant, spread over a couple of years won't sink the ship and I do suggest that we accept in its best spirit our submission to a standardisation body in this country. It will standardise the appliances that we have to see connected to our mains. We cannot have it both ways and we must work to standards ourselves and, therefore, I welcome the structure suggested by the Bureau of Standards.

Mr. MULLER:

I would also like to thank Mr. Ritchie and Mr. Clarke for what they have said in this matter. I don't quite agree with Mr. Fraser that it is new. We have heard of it for quite a while. We have tried to assess our responsibilities but it is only now that I have the complete figures with which I will be faced that I will be able to assess it.

I welcome the Code as such. I think it is time we arrived at some basic standard when it comes to meter accuracy. The only worry in my mind is the matter of labour. The cost sunk in a matter of half a million on new plant will make very small play, but whether we shall be able to get qualified labour for the job remains to be seen. I recently advertised a position and the only nearly acceptable candidate was from my own staff; the others were all sorts of people bar meter testers and until we get meter testers from overseas—qualified meter testers—which I believe will be somewhat difficult because they use girls to a considerable extent, and until such time as we can get relief in the way of stationary requirements for meter testing labour, we may find ourselves in difficulties. I don't quite see that you should want a five years' apprentice to count ten or thirty revs. of a meter, push a switch, and do simple standardised calculations. I can see the need for proper testers, when it comes to supervising calibration of standards or repairs—that is a different matter.

Mr. BARRATT, Graaff-Reinet:

Mr. President, am I correct in understanding that C class stations will not be established? No reference has been made to the smaller class of station, only to A and B stations.

Mr. CLARKE:

The reason that Class C has not been mentioned is because on the figures that we calculated, there is not an undertaking in the Union which could economically test meters as a Class C station. As I said in my report, assuming starting from scratch, it would cost something like £750 to put down that station and any station other than one of the larger municipal areas referred to has such a low number of meters that even the capital return on that £750 would be prohibitive on electricity meters. There is no reason why any undertaking who wishes to put down a station and is able to get the money for it should not do so, but the whole essence of this scheme is to aim at the most economic arrangement over the Union as a whole. I would like to mention whilst I am speaking in reply to Mr. Milton that we

have discussed with Escom the possibility of stations either in Natal or in the Cape Province, and I rather left it open because there is no finality in the actual detail of these stations and I felt we had not got to the stage when we could say so and so is going to put a station there.

Mr. DOWNEY, Springs:

Mr. President, Ladies and Gentlemen; we have heard quite a lot this morning about economics in regard to distribution and supply of electricity. This afternoon we have heard quite a lot about the cost of introducing a scheme for saving money. I put it that way, Mr. President, because up to now there are no figures available to show that the supply undertakings in this country are not losing a considerable amount of money because their meters have not been tested.

Mr. FRASER, Johannesburg:

I don't think that that is altogether correct. I had an idea that most of us were working on well established stations at the present moment.

Mr. RITCHIE:

The total for South Africa is 400,000 meters and 200,000 have been tested. Members said that they never let a meter go more than six months as it pays them to have their meters tested regularly.

I agree that Mr. Downey's statement is correct.

PRESIDENT:

I am concerned with the labour shortage. Trade Union troubles would start should we attempt to dilute labour. Is there any possibility of getting legislation to allow us to carry out this meter testing by semi-skilled or unskilled labour, otherwise it will affect our costs considerably. It is not only the capital expenditure—it is the continuing labour cost to carry out this work.

Mr. RITCHIE:

As stated earlier, the Bureau has no jurisdiction over the Labour Department and I quite sympathise that there is a general shortage of labour in the country, but if you use a scheme as outlined there won't be a large increase in the number of people to be used. I don't know whether you could get the girls here save as office workers.

Mr. MULLER:

Could I ask Mr. Smith what his feeling is on the suggestion of using girls for meter testing from the labour point of view?

Mr. H. O. SMITH:

Well, Mr. President, I am afraid I am hardly qualified to speak on that because my contact with the Trade Unions in that respect is not as intimate as perhaps the people generally understand. You realise, of course, that while my department deals with labour in all respects, there are various divisions in the Department that take up various aspects. The chief legislations dealing with labour conditions and Trade Unions are the Wage Act and the Industrial Conciliation Act. Unfortunately, the Factories Act does not control wages in any way and I am sorry to disappoint this Convention in that I am only really conversant with the Factories Act, but such contact as I have had with Trade Unions and labour legislation leads me to believe that after it is explained to the Unions that this work is not by any means skilled, that it is purely repetition work and can be learned within a very short time by an unskilled person, my experience is that the Unions will regard that in a favourable light and not raise any serious objections. I am saying that because it has already been done in many other trades.

We have under our Wage Determination Act, as you probably all know, such classes of workers defined as "operators" who are, in many cases, Natives. Well, those operators, even in the engineering industry, are by no means skilled workers and are yet accepted by the Trade Unions

as persons who are entitled to do certain work. I cannot, of course, by any means commit my department—I want that to be clearly understood. Nor can I speak for the Trade Unions, which must also be clearly understood, but speaking from my general experience I should say that it is quite possible that these girls will be acceptable to the Unions.

Mr. RITCHIE:

Might I just comment on that? Are we not getting the matter a little bit out of perspective? The country is now going to develop huge schemes in the Free State for electricity: where are all those people going to be found?

PRESIDENT:

If we are going to electrify the country it will take a long time also.

Any further comments on the meter testing code?

Mr. MOSSOP, Vrede:

I am of the opinion that some consideration ought to be given to the 200,000 consumers who don't know whether they are getting what! They know if they go to the grocer that they can get sugar and it is properly weighed—we give something which is not properly measured. Something ought to be done.

Mr. NICHOLAS:

I am rather concerned about compulsory meter testing, as under Kelvin's Law we weigh the cost of Fuel against the capital cost of Copper. In a similar way if we weigh the cost of testing meters against the losses in revenue, in Umtata, the cost of testing meters would be at least £400 per annum, against the loss of revenue of £200 per annum. I do not know what the auditor's view would be on this point. I feel in regard to meter accuracy we are giving the public a satisfactory commodity and are not doing it down in any way, and I think the general trend should be, leave meter testing as it is at present. If we correct present losses to this Municipality it would actually cost us more in the long run, and I feel a little more investigation should be made, and even go so far as to take a number of small towns, in which specific tests can be carried out.

In the 26 years I have been in a small town I have tested numbers of meters, and found that with a 2½% error we can give our meters a reasonable test. I feel that if my suggested basis of tests were carried out in small towns, a decision should then be arrived at in say 2 years' time, when it will be known whether the new standard would be of a practicable benefit.

On the question of transporting these meters, I have experienced that although a meter has been certified correct, that on arrival at Umtata, one out of three of these meters has been completely out of gear.

In the past 26 years I have had two or three meters running fast due to creeping, but have never had any local dispute due to meters running fast. I do support the principle whole-heartedly, but I do not think we are ready yet to have meter testing compulsory.

PRESIDENT:

We have had expressed this afternoon opinions for and against the adoption of the meter testing code. I don't know whether it is the desire of this Convention to give a mandate? Mr. Fraser implied that he would like a motion to be moved on this matter. Would you like to put the motion before the meeting Mr. Fraser?

Mr. FRASER, Johannesburg:

Mr. President, I will willingly do so to act as a guide to the two gentlemen who have been kind enough to give us all the information about the Act. Do we consider now is the time to introduce the proposed Act or would it be better to leave it over for a little longer. I do feel that a good many of our members would like the opportunity to digest what

has been heard this morning and then come to the next Convention fully prepared to argue; and I now move that the S.A.B.S. Meter Code Association or Committee consider holding their suggested Code of Practice in abeyance for a period of 12 months, when labour and material would be in better supply than now.

PRESIDENT:

You have heard the motion before you. Is there a seconder?

Mr. VERGOTTINI, Brakpan:

I second that proposal, and in doing so would like it to be remembered that a man must also be paid to take every meter out and again when it is being put back and all that will add further to the final cost of electricity.

PRESIDENT:

You have heard the motion, all those in favour?

(24 members voted in favour).

Against? (37 members voted against).

The majority is against you Mr. Fraser. I declare the motion lost. The consensus of opinion is ,therefore, that the Meter Testing Code should be introduced as suggested by Mr. Ritchie.

Mr. GREGOR, Alberton:

Mr. President, may I put a motion in connection with the adoption of the Meter Testing Code?

PRESIDENT:

Yes.

Mr. GREGOR:

Mr. President, Ladies and Gentlemen; I feel that the amount of good work which has been done by the bodies concerned in bringing the Meter Testing Code so far should be appreciated. I feel that the smaller municipalities will benefit by the Meter Code and cannot afford to wait. A delay of two or three years will be harmful. I formally move that a resolution from this Convention go forward to the S.A. Bureau of Standards thanking them for what they have done and to ask them to proceed with the Meter Testing Code with as much speed as possible to bring it into operation.

The Convention adjourned at 3.25 p.m.

The Convention resumed at 3.55 p.m.

SALARY SCALES

PRESIDENT:

Item No. 8 on the Agenda deals with Salary Scales. At the Convention last year it was resolved that we circularise all municipalities with regard to the salary scales for Electrical Engineers. To make this matter clear, it is purely a suggestion to the municipalities as to the scales which we suggest they should pay to obtain the services of competent Engineers. That, I have to report, has been done, so I think we can discharge that matter now. This Association cannot go any further than that.

Mr. E. L. SMITH: Boksburg:

With regard to the salary scales, I would like to suggest that we also send these recommendations to the Secretary of the Local Municipal Associations as they deal with the salary grading schemes and should be in possession of the facts.

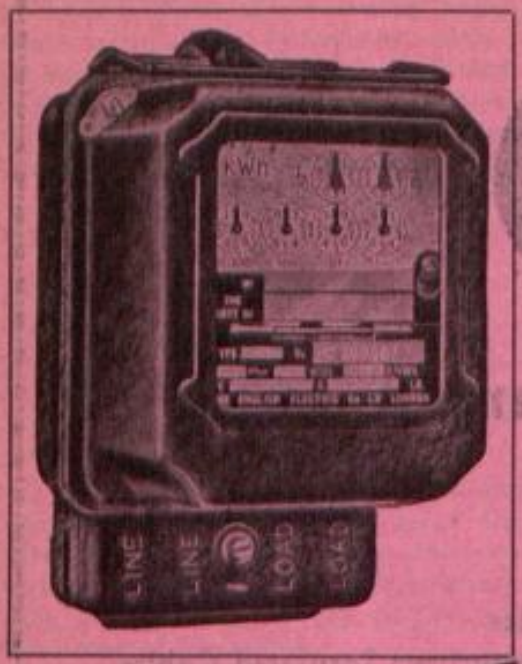
PRESIDENT:

In reply to that, that has been done also.

Mr. E. L. SIMTH, Boksburg:

What happens is that the Town Clerk receives a copy of the proposed salary for Engineers and refers it to the Electrical Engineer for report to his Committee, and all they do is to say "noted."

I suggest that the Secretaries of each local branch of the Municipal Association be notified and asked to incorporate the



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proposed salary in any new salary re-grading.

Mr. FRASER, Johannesburg:

Mr. President, if I be permitted, Sir, as far as my memory serves me the attitude of the Executive was that we had fulfilled the request that had been made to us by various Town Clerks and given them an indication of the minimum salary they should offer instead of advertising "State salary required." Having done that, we fulfilled our duty and there has been no further correspondence with any Municipal Association.

PRESIDENT:

That is the position and your Executive does not think it desirable to pursue the matter any further. Any further comments on that subject?

Mr. FEREIRA, Odendaalsrus:

May I ask whether this only refers to Engineers or also to Wiremen and Shiftmen, etc.?

PRESIDENT:

That refers only to the Electrical Engineer in charge of the electricity undertaking of the town.

PROTECTION OF ELECTRICAL ENGINEERS

The next item on the Agenda is No. 9, the Protection of all Electrical Engineers. I will ask the Secretary to read the replies he has received.

SECRETARY:

Mr. President, Gentlemen; as instructed, a letter was sent to the Provincial Secretary of each of these Provinces—O.F.S., Natal and the Transvaal—who don't afford protection for their Electrical Engineers. The reply from the O.F.S. was to the effect that the matter was receiving attention. In so far as Natal is concerned, they intimated that they were not prepared to sponsor such a recommendation. The Transvaal replied that the matter would be considered when the next amendments to the Local Government Ordinance are under consideration.

PRESIDENT:

That is the position gentlemen. Are there any comments on those replies? I think most of you know the history of the subject.

Mr. SIBSON, Bulawayo:

I must have overlooked it last year, but it seems that no letter was sent to Rhodesia on this subject. Rhodesia shares with the Transvaal and Natal and the Free State the same unhappy position and I suggest a letter to the Department of Internal Affairs should be sent, as they are the responsible body in Rhodesia.

PRESIDENT:

I think that could be referred to the Executive.

Mr. STEVENS, Ladysmith:

Mr. President, I feel that we should pursue that matter further if at all possible. The need of protection for Electrical Engineers is a matter I consider necessary.

Two councils I have had dealings with of late subordinate their Electrical Engineers to other departmental heads; in both cases when protest was registered steps were taken to elevate the Electrical Engineer's position. The necessity for Electrical Engineers to have to prove the importance of their position is incredible because of the very fact that municipalities are compelled to employ Certificated Engineers in the interest of the safety of the Burgesses, exactly the same as when they employ a Doctor as a Medical Officer to look after the health of townspeople. Legislation provides that Certificated Engineers and Health Officers have to be employed, but does not insist on other heads of departments having to have certificates of competency.

In some municipalities Electrical Engineers perform the duties of Civil Engineers and even Town Clerks, as may be seen in a newspaper cutting I have where the Electrical Engineer of a certain town is its Town Clerk as well, for alongside the Town Clerk's signature are his letters of designation indicating that he is an Associate Member of the Institute of Engineers.

I submit that this Association should persist in its endeavour to obtain the same protection for Municipal Electrical Engineers as Town Clerks, Town Treasurers and Town Engineers.

PRESIDENT:

The position, Mr. Stevens, is this, that in the Cape Province the City Electrical Engineers are protected in law, i.e., the councils cannot dismiss them without the sanction of the Administrator; that is the point we are talking about, their dismissal, not their duties. We enjoy in the Cape Province the same protection as Town Clerks, Medical Officers of Health and City Engineers, but in the other Provinces that does not apply. That was the point we were concerned with, not the taking over of the duties of the Electrical Engineer by the Town Engineer.

Mr. STEVENS:

I understand that perfectly, but I cannot see why we should not enjoy that same protection if our position is of equal importance and therefore Town Councils should not be in a position to dismiss an Electrical Engineer in the same way as they cannot dismiss a Civil Engineer or a Town Clerk.

PRESIDENT:

We have pursued that matter as far as we can and I don't think we can go any further. We have taken up the matter with the Provinces concerned.

Any comments on that subject?

S.A. STANDARDS INSTITUTION

I would now ask Mr. Downey to deal with Item 7 (vi)—the S.A. Standards Institution.

Mr. DOWNEY, Springs:

I have to report that regular monthly meetings have been held by the Institution during the year under review.

Numerous draft and completed specifications have been received from similar organisations overseas. A list of these specifications is here for inspection should any member wish to see them.

The Institution has compiled a schedule of the South African Specifications including the British Standard Specifications that have been adopted as South African Specifications, which is also here for inspection.

The Institution is a voluntary body maintained by donations from firms, interested bodies and persons, and as such, has made an appeal to your Association for a donation. Your Executive has considered this matter and recommended that the Association make a donation of £5 5s. On behalf of your Executive, it gives me great pleasure in moving accordingly.

PRESIDENT:

Thank you Mr. Downey. Gentlemen, you have heard the Report of Mr. Downey. Will someone second its adoption.

Mr. KINSMAN, Durban:

I second that, Mr. Chairman.

PRESIDENT:

The motion has been proposed and seconded. All those in favour? All those against?

The motion is carried.

SAFETY PRECAUTIONS COMMITTEE

PRESIDENT:

I would again ask Mr. Downey to take charge of the Safety Precautions Committee's Report.

Mr. DOWNEY, Springs:

I have to report that no meeting of the Safety Precautions Main Committee has been held during the year under review.

In reply to a circular sent to all members of this Association, a number of proposed amendments to the Standard Wiring Regulations have been received and forwarded to the Amendments Sub-Committee of the Safety Precautions Committee, which has been meeting weekly since the last Convention. This Sub-Committee has now finished its work and a list of the recommended amendments will be ready shortly for consideration.

The Sub-Committee has gone through the Regulations very carefully in order to cut out any ambiguities, to clarify wording and to revise the Regulations in the light of experience gained during the years of working to the First Edition.

The Sub-Committee has been guided in a number of its recommendations by amendments which have been made in the new Regulations of the Institute of Electrical Engineers of London, since the date of publishing the South African Regulations, and also by suggestions which have been put forward by Members of the Association. These suggestions and comments have been most helpful, as in some instances they have brought up points which had escaped the notice of members of the Sub-Committee, and I have been asked to express the gratitude of the Sub-Committee for this assistance in their work.

I formally move the acceptance of this report.

PRESIDENT:

Are there any points you wish to raise on that matter? If so, the matter is open for discussion.

Mr. NICHOLAS:

With regard to the amendments of Standard Wiring Regulations, what is the position of those towns which have already promulgated these Regulations. Do they have to re-promulgate all amendments; in other words, how do amendments become law for these towns?

Mr. MILTON:

It would be necessary to go forward for the amendment of the Provincial Regulations of the Cape, under which the Cape Province operates. In the other Provinces you have the same idea but a different procedure in the promulgation by municipal authorities. Group promulgation, requiring "group" action will be necessary in the Transvaal, Natal and Free State.

PRESIDENT:

No. 9, the Coal Commission. Would Mr. Eastman take charge of that?

COAL SUPPLIES

Mr. EASTMAN:

Mr. President, Gentlemen; you will remember at our last Convention we were all greatly concerned with the possibility of coal burning stations meeting with a shortage of coal during the coming winter. That fear materialised throughout the whole country. At about the same time, the Government instituted a body called the "Coal Commission" whose terms of reference opened the door to us to make recommendations that as coal was an essential commodity to a service it was of national importance and priority ought to be given to the production and also transportion of that coal in quantities sufficient, not only to get a power station going, but to build up reserve stocks if and when stocks were depleted.

Representations were made to the Coal Commission on behalf of the Association of Municipal Electricity Undertakings by Mr. Kinsman early in April, 1947, as reported to the Association in Mr. Kinsman's memorandum dated the 12th April,

1947. Similar evidence was given by the Electricity Supply Commission to the Coal Commission in May of that year.

Because of the precarious position most power stations found themselves in, in July and August last year, your Association, acting on a suggestion from Port Elizabeth, persuaded the Minister of Economic Development to receive a deputation. A conference was accordingly convened and held in Pretoria on the 28th October, 1947, at which the Minister of Economic Development, the Hon. S. F. Waterson, presided, the following Government Departments, Organisations and Municipalities being represented:—

The Department of Commerce and Industries.
The South African Railways and Harbours Administration.
Price Control.
The Transvaal Coal Owners' Association.
The Natal Associated Collieries (Pty.) Ltd.
The Electricity Supply Commission.
The Municipality of Cape Town.
The Municipality of Johannesburg.
The Municipality of Port Elizabeth.

The following are the lines on which representations were made:—

It is very gratifying to the representatives of electricity supply undertakings that their suggestion for the holding of this Conference has met with such ready response by all interested parties, for they feel that this is an indication that the Government, as well as the coal producers, share fully with them the realisation that the supply of electricity is of such importance to the life of the community as to make its satisfactory functioning a matter of national and not merely parochial interest.

It is no exaggeration to say that the Union of South Africa is one of the most "electrically minded" nations in the world.

In many large centres the community is mainly if not wholly dependent upon the public supply of electricity for interior illumination, for the heating of water, the cooking of food and for the operation of the local public transportation services. In addition the supply of water for domestic purposes, the operation of water borne sewage disposal systems, the functioning of hospital services, the working of the Post Office telephone and telegraph system and harbour services and all industrial enterprises are entirely dependent upon continuity of the public supply of electricity.

Interruption or even curtailment of the supply of electricity would thus bring about most serious disorganisation of civic life. The supply of electricity in such centres is indeed a vitally important service.

It is, however, common knowledge that seasonally supplies of coal from which electricity is produced fall so far short of the requirements as to bring about serious hazards to the continuity of supply and that this hazard has, during the past few years, persisted over long periods.

The fact that public requirements of electricity are growing rapidly with correspondingly rapid increase in their requirements of coal makes it all the more important that the salient features of the causes of these hazards be removed as soon as possible.

For the reason that the supply of electricity for domestic and industrial purposes and for essential municipal and other public purposes are so intimately connected with the economic well being of the public, it is submitted that this service should not be subjected to periodic danger of cessation or even curtailment through causes beyond its control, such as lack of coal supplies.

The suppliers of electricity, therefore, submit for earnest consideration that ways and means be found of avoiding the recurrence of the difficulty of this nature in which they have found themselves placed, and to that end they suggest that public electricity undertakings be accorded such priority in respect of the production and transportation of coal in quantities always sufficient for their current needs as will enable them to maintain their stocks of coal on site at such a level as may be reasonably necessary to tide them over unanticipated contingencies.

The suppliers of electricity are aware of some of the complexities of the problem but they felt, when suggesting that this Conference be held, that a full discussion of the matter by all concerned might lead to a solution of it which might be expected to avoid recurrences of the hazards to which their service has been imposed in the past.

Urgent representations were made on behalf of the producers of electricity to the effect that the supply of electricity for public purposes in the Union of South Africa had become so vital a necessity to the lives of the communities served as to have become a matter of national interest. As the primary source of energy for the production of electricity is coal, it becomes a matter of national importance that electricity undertakings receive supplies of coal in sufficient requirements not only for their daily needs but also in sufficient quantities to build up reserve stocks of coal to tide them over unanticipated contingencies and temporary difficulties in obtaining supplies as well as to provide for variations in the rate of deliveries of coal due to circumstances over which neither the collieries nor the Railway Administration may have any control.

It is pleasing to be able to record that the Minister freely accepted the proposition that the maintenance of supplies of electricity was a matter of national importance and that it was necessary to take every possible step to see that supplies of electricity would not be curtailed through insufficient coal being received by electricity undertakings in quantities sufficient for their requirements.

Discussion ensuing, the representatives of the coal producers pointed to the difficulty in supplying the type of coal required by power stations in sufficient quantities because this type of coal ("pea" coal) is obtainable only either by screening round coal, the greater portion of which is exported, or by crushing round coal specially to produce the type of coal required.

A proposal was made by the colleries and accepted on behalf of the municipalities that the upper limit of the size of "peas" be increased from ¾ in. to 1 in., by which means a certain amount more "peas" would be made available for power production purposes. Even this, however, will not increase the quantity sufficiently for all the requirements. The problem of supplying sufficient "pea" coal is, therefore, bound up largely with the extent of the export trade in round coal which, largely due to shortage of trucks, has diminished to such an extent that insufficient "peas" are obtainable without crushing. Even if sufficient trucks were available for much greater export trade than exists at the present time it was thought likely that because of the continual increase in the requirements of coal for power production purposes due to the continuing increase in demands for electricity, the crushing of round coal specially for power station purposes would have to be resorted to.

The collieries pointed out that to do this would involve additional costs to them which would have to be passed on to purchasers of coal. The principle was agreed by the Minister that an increase in the price of coal for this reason was deserving of sympathetic consideration and it was understood that the Price Controller would receive statements on this matter by the coal producers at an early date.

On behalf of the producers of electricity it was submitted that as the production of electricity was now a matter of national interest, particularly as the cost of electricity was related to the cost of living, they looked to the Government, through the Price Controller, to protect electricity undertakings on the question of any increase in price allowed for "pea" coal.

It was stated that the truck position was extremely difficult so that the difficulties which electricity undertakings are now experiencing in obtaining coal sufficient for their requirements may be expected to persist until late next year when the Railway Administration thought

that the truck position would improve. It was pointed out that this was a most serious state of affairs and that the Government should recognise it as such.

In reply, the Minister stated that the Government recognised the need for granting priority No. 1 to the supply of coal for electricity undertakerings even to the extent, if necessary, of reducing the facilities for exporting coal so as to ensure that coal would be available for transportation to electricity undertakings.

It is to be regretted that at the conference no concrete positive proposals were put forward to show how the difficulty now experienced will be avoided in the future, but it is felt that a very useful purpose was served by the conference in the opportunity which was afforded all concerned to place their difficulties so clearly before the Minister, and a certain amount of satisfaction is felt in the fact that on behalf of the Government it has been stated that the importance of maintaining supplies of coal, sufficient for the requirements is recognised by the Government.

I am informed today that the Price Controller has agreed to the price of "nut" and "pea" coal being increased, and to the grading of these classes of coal being increased in the upper sizes from 1¼ in. to 1½ in. and ¾ in. to ⅞ in. whereby it is expected that greater quantities of these grades will be available for power station purposes without resorting to crushing.

Since writing this report, I understand that during the past few days the Price Controller has allowed an increase of 1/3d. per ton on contract prices for "pea" coal from Transvaal collieries.

I do feel that our representations have had very good effect, and although a number of undertakings may not have as much coal this year as they would like, I believe that with the clear-cut recognition on the part of the Government that power stations must not shut down for the want of coal, that we will not get into such a precarious position as we did last year, and that the position will improve.

PRESIDENT:

Thank you, Mr. Eastman, for your very explicit report on the subject. I don't know whether Mr. Milton cares to make any comments on this matter.

Mr. MILTON:

Mr. President, I am in rather a difficulty in commenting on that point but I support the views put forward by Mr. Eastman in this matter. There is certainly a coal shortage due to the nature of the commodity we are burning and the shortage of railway trucks. I know the Government are taking steps in connection with shortage of trucks but the shortage might arise from an alternative source, i.e., that "pea" coal is only a portion of the total coal mined and there may be a "pea" coal shortage and the possibility of crushing is also mentioned, but that is something apart from the Report on this item of the Agenda. On the other hand, I think I am correct in saying that the increase of 1/3d. per ton applies to coal from the Transvaal and not from the Natal mines.

Mr. EASTMAN:

I know; it is from the Transvaal.

PRESIDENT:

It is only applicable as far as the Transvaal is concerned at this stage.

CRUDE OIL

Mr. MILTON:

On this subject I would appeal to you for a ruling. Am I entitled to bring forward the price of crude oil at this stage?

PRESIDENT:

Everything has gone very well and I think it would be of very great interest to members to hear it.

Mr. FRASER, Johannesburg:

Could not Mr. Milton raise that under general if we have time? We have quite a lot of other Reorts to get through.

PRESIDENT:

You can bring that up under "General," Mr. Milton.

OVERHEAD LINES CODE OF PRACTICE

I will now ask Mr. Fraser to give his Report on Overhead Lines Regulations and Code of Practice.

Mr. FRASER, Johannesburg:

The Drafting Sub-Committee recently completed its final draft Code of Practice and, although this is still to be regarded as a confidential document, copies have been made available to members of the Executive Committee of this Association. The draft has now to be submitted to the Council of the S.A.I.E.E. and thence to the Main Overhead Lines Code of Practice Committee for comment.

In previous reports I have listed the various bodies represented on the Main Committee and have given an outline of the field covered by the draft code. As you are aware, the preparation of this code was undertaken as a result of the realisation by the S.A.I.E.E. of the desirability of providing a guide to those engineers who are only rarely called upon to plan overhead transmission lines. Its function is thus to draw attention to the factors to be borne in mind in the design, construction and maintenance of overhead lines and to indicate ways and means of overcoming some of the difficulties liable to be encountered. The document prepared by the Drafting Sub-Committee—which I may say, Mr. Chairman, runs into over 60 pages of foolscap—fully satisfies these requirements and, in my opinion, will prove of immense value not only to engineers in the above category but also to those more frequently engaged in the design of transmission lines.

PRESIDENT:

Thank you, Mr. Fraser. Are there any comments on Mr. Fraser's Report?

Mr. BRADLEY, Port Elizabeth:

Mr. President, if I am allowed to, I would like to say how grateful we are to this Committee. The Report is of considerable length and by glancing through it I should say there is much information that would be useful to us all when we have been able to digest it and perhaps discuss it some other time.

Mr. EASTMAN:

Mr. President, I would like it made clear what is to be the procedure in regard to the adoption of this Code of Practice. Are we to adopt it or recommend it or are we to have the opportunity of scrutinising it before it is put into operation. What is the position?

Mr. FRASER:

As explained in my Report, this document has come from the Drafting Committee. It will be handed to the Council of the S.A. Institute of Electrical Engineers who will in turn hand it back to the Main Committee, and if you look up the previous proceedings you will find that the Main Committee embody representatives from practically all interested bodies who would be associated with overhead line transmission. That Committee will either approve or amend the draft, and then it is hoped to hand it back to the South African Institute of Electrical Engineers and they will probably adopt it as a Code of Practice.

PRESIDENT:

Thank you, Mr. Fraser. Does that reply to your point Mr. Eastman?

Mr. EASTMAN:

Yes, Mr. Chairman. I am satisfied as long as we have ample opportunity of going through this Code of Practice and commenting on it.

DOMESTIC APPLIANCES MECHANIC

PRESIDENT:

Mr. Andrew, you raised a point yesterday with regard to domestic appliances which was not settled.

Mr. ANDREW:

Mr. President, I don't think the point was actually raised because we did not quite finish the discussion arising out of the practice of wiring in the undetermined areas.

PRESIDENT:

Will you bring the matter up now then?

Mr. ANDREW:

Mr. President, Ladies and Gentlemen, the point referred to was touched on this morning when Mr. Ritchie, of the Standards Bureau, pointed out the number of items they had under consideration for the preparation of a Standard Specification and the question of the A.C./D.C. Radio or "hot work" was raised.

The question has been discussed in the lobby and that is this, the safeguards required in the repair and maintenance of appliances. The Wiring Regulations cover the wiring work installed in the particular consumer's premises but as regards the appliances connected thereto, the portable appliances, there appears to be no protection—I don't think "protection" is the right word—there seems to be no control over the proper and skilled repair of those appliances. Anyone with a smattering knowledge can carry out that work on the instructions of the consumer and it can be put back into service without having been examined, and I think that point, Mr. President, was very clearly brought up last year in Durban, when Mr. Bradley was involved with a similar case in the repair of a kettle.

PRESIDENT:

The point is, in the Transvaal they have now gazetted a specified trade of Domestic Appliances Mechanic.

Mr. FRASER, Johannesburg:

Mr. President, I am rather glad that this question has been raised because it was my intention to raise it before the end of the Convention.

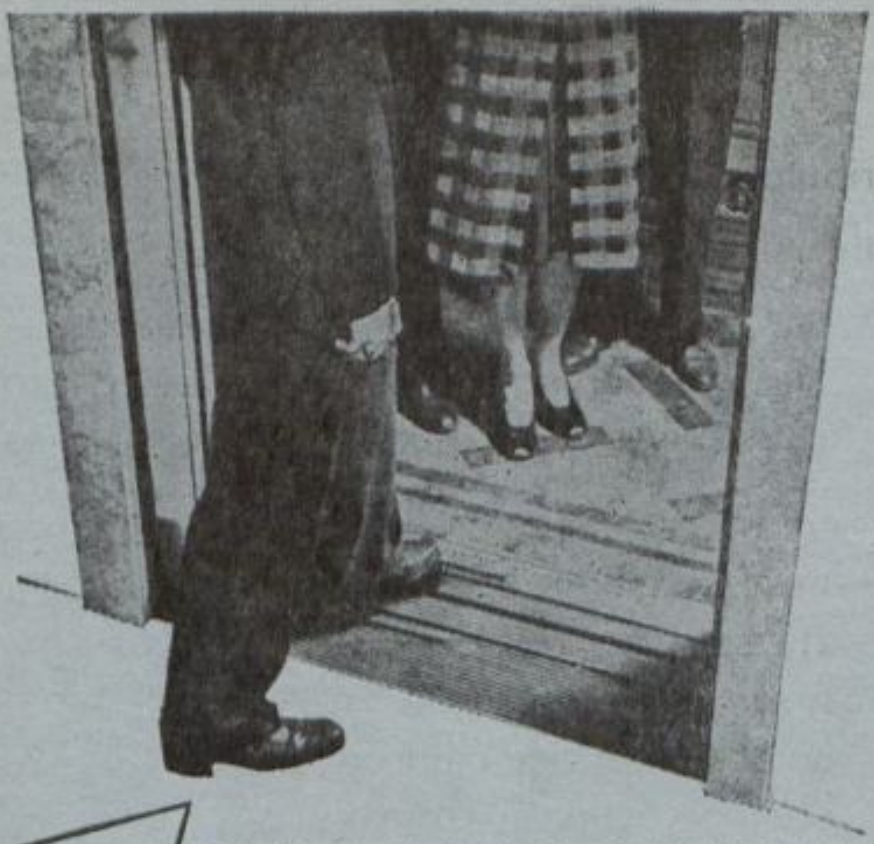
The position is that on the recommendation of the National Apprenticeship Board, and after consultation with the Transvaal Mechanical and Electrical Engineering Apprenticeship Committee, the Minister of Labour advised, through the Government Gazette, dated 14th November, 1947, that the Government had made provision for the training of what will be known as **Domestic Appliances** Mechanics, such an apprentice to be trained in the maintenance and repair of domestic electrical appliances including refrigerators, electrical ranges, heaters and similar apparatus.

In my opinion, if there is a demand for this type of tradesman then when he has completed the apprenticeship period he should pass an examination and be registered in the same way as the Electrical Wireman, who is at present registered under the Electrical Wiremen's and Contractors' Act, 1939.

This matter was brought to the notice of the Council of the S.A. Institute of Electrical Engineers, who suggested to the Minister of Labour that, in the interests of public safety, consideration should be given to the question of registering these mechanics in exactly the same way as electrical wiremen.

The Secretary of Labour in his reply stated that the National Apprenticeship Board had under consideration methods of ensuring proper control, tuition and technical instructions for the electrical appliance mechanics which should do much to reduce the risk of accidents to a minimum, and, registration, as suggested, was unnecessary.

The Council of the I.E.E. again advised the Secretary of Labour that such registration was necessary and offered to assist the Labour Department in drawing up suitable amendments to the existing legislation to meet the position.



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The Secretary of Labour, however, in his reply reiterated that it was not considered necessary for the mechanics in question to be subject to the provisions of the Electrical Wiremen's and Contractors' Act, 1939, and regretted his inability to take any further action in the matter.

The Council of the I.E.E. are still considering what further action they should take.

In submitting this matter to the Executive Committee during this Convention I think I am right in stating that the Executive Committee consider there is a grave danger in training a boy to be a Domestic Appliances Mechanic only, as there is insufficient interest or scope for such a tradesman, and, it is only natural that in time he would penetrate into the Electrical Wiremen's preserves for an outlet in which case one would have a half trained tradesman.

There are the two points of view—should we request the Minister to register Domestic Appliances Mechanics on completion of their apprenticeship or, should we advise the Minister of the dangers in the proposal, and suggest that the training in the repairing of electrical domestic appliances should not be separated from that of the training of electrical wiremen.

I would like to move for your approval that the Association instructs its Executive Committee to prepare a suitable resolution to be forwarded to the Minister of Labour, to the effect that it sees a very grave danger in training apprentices as Domestic Appliances Mechanics only, and it is considered the repairing of Domestic Appliances should be part of the Electrical Wiremen's training, who, on completion of his apprenticeship, would be registered under the Electrical Wiremen's and Contractors' Act, 1939.

I need hardly point out the danger, to my mind, of not having an individual who repairs your appliances registered. It would almost nullify the good work that this Association and the Wiring Board had done for the past eight years in bringing up the safety of the wiring installation to the state we find it in today. I have very much pleasure in moving that resolution.

PRESIDENT:

Thank you, Mr. Fraser. Mr. Fraser has expounded very clearly the views held by the members of your Executive and we feel very strongly on this matter. We think there is no need to have a separate trade such as a Domestic Appliances Mechanic, but if it is necessary it should be incorporated in the Electrical Wiremen's trade. The youth, when he has carried out a portion of his training, then continues as an Electrical Wireman and gets a certificate as such, because, as Mr. Fraser epitomised the position, this youth at the end of his training as a Domestic Appliances Mechanic would not be recognised as a Wireman, and if he goes out trying to wire surreptitiously, we will allow to be undone all the good work we have done. I endorse what Mr. Fraser has said and ask for a seconder.

Mr. DOWNEY, Springs:

Mr. President, I have much pleasure in seconding Mr. Fraser's motion. I do so because I fully realise the dangers of allowing this Domestic Appliances Mechanic to interfere with apparatus that has been standardised by the Bureau of Standards.

Most of us know what happens in contracting concerns when a kettle or an iron comes in for repair. There is another factor, a stove has to be repaired, and under the Act only a registered wireman may disconnect that stove from the installation. It is necessary, therefore, in my opinion, that Domestic Appliances Mechanics (if they be such) should be in possession of Wiremen's Registration Certificates, and, therefore, I have much pleasure in seconding Mr. Fraser's motion.

Mr. MILTON:

Mr. President, if I may speak to that point I think your Association is losing sight of a very vital point. The attempt at the establishment of a designated trade for the repair of appliances was, I think, a genuine step in the right direction, to bring the repair of appliances under trained workmanship. If you put forward your resolution as it has now been suggested you will certainly be looking after a type of trainee who will ultimately become a Registered Wireman, but you are not doing the most vital thing of all, that is ensuring that the repair of domestic appliances should only be done by skilled persons.

In so far as Mr. Downey's remarks about the stove are concerned, he is not quite correct. In the case of the Cape Town Municipality, for example, and the Commission system generally, the stove can be connected, and is most frequently connected through an ordinary plug and socket. There is nothing in the Regulations to prevent an owner from withdrawing a plug from a socket and doing what he likes with the apparatus so connected. It is only where the stove is connected permanently with a fixed installation that it becomes a part of the fixed wiring work. I would recommend that, coupled with your recommendation there should be a further recommendation that the repair of domestic appliances should be brought under the jurisdiction of the Factories Act, in the same way that the fixed installation is controlled. Anyone employing a person not so registered would then be equally guilty with the party doing the repair.

Mr. EASTMAN:

Mr. President, I think I should make it clear that what Mr. Milton said is just the very intention, that the person who repairs an electrical appliance is a person who has had sufficiently skilled training to enable him to obtain his Wiremen's Registration in due course and unless he has got that registration he cannot do that work.

PRESIDENT:

Yes, that was the intention of the Executive very definitely.

Mr. SMITH, Inspector of Factories:

Mr. Milton has stolen my thunder, for which I am very grateful because he has put the case very clearly. But I think he made a slight slip when he said that the Factories Act is controlling the wiring; it is the Wiremen's and Contractors' Act. I would also like to point out to the meeting that if what is intended is brought about it would require an amendment of the Wiremen's Act — that is understood, I think.

PRESIDENT:

Yes.

Mr. KINSMAN, Durban:

When we dealt with this subject previously we were faced with this difficulty —it was unreasonable to ask that the repair of appliances should be done only by registered electricians when there was no control over their manufacture. Now that there is to be standardisation in the matter of the manufactured article we can more confidently ask that its repair should be under control.

Mr. BRADLEY, Port Elizabeth:

Do I understand that this trade would necessitate a five year apprenticeship?

Mr. FRASER, Johannesburg:

Yes.

PRESIDENT:

Then at the end of that five years they have to become registered?

Mr. FRASER:

No, Mr. President, there is no mention of the years, but as it comes under the Transvaal Mechanical and Electrical Apprenticeship Committee and is listed along with millwrights, etc., I take it the same number of years apply as in any other trade.

PRESIDENT:

Well, the motion has been seconded and is before the meeting. Are you agreed that a suitably phrased letter be sent by your Executive to the Minister bringing forward these recommendations and our feelings on the matter?

MEMBERS:

Agreed.

PRESIDENT:

I don't know whether Mr. Andrew is prepared to reply to any comment on his Paper? There were one or two points raised by Mr. Muller and Mr. Wilson.

Mr. ANDREW'S REPLIES TO SPEAKERS ON HIS PAPER

Reply to Mr. Sibson (Bulawayo):

I would first thank Mr. Sibson for opening the discussion on my Paper. His main reference to the three points raised, namely, transformer capacity, earthing and the difficult problem of attempting fair allocation of charges for supply to each consumer, are each in themselves subjects worthy of separate Papers.

As regards the rating of transformers, whether these be for individual consumers or for groups of consumers, one can only rely on experience with local conditions, together with engineering knowledge, to fix the capacity of the transformer in question. The Paper dealt mainly with the rating of transformers, for the supply to individual consumers, and in such cases the installed load and the routine and habits of the consumer are the only guide to the selection of the rating required. I quite agree with Mr. Sibson's views that a particular load curve may not be maintained throughout the life of a single installation, but by bearing in mind that the lowest rating which may be selected for any given curve is the R.M.S. rating, reasonable allowances can be made for variation in the routine or habits of the particular consumer. Should, however, additional apparatus be installed or the installation be put to other uses, the Supply Authority, with prior notice of such changes, will naturally investigate the effect such changes would have on the service equipment. As stated in the Paper under the heading "Transformers," the difficulty in practice is to predetermine the curve. Experience will, however, together with sampling of individual loads, soon indicate what margin, if any, should be allowed in the rating of a transformer, above R.M.S. load, to allow for any variation in routine or habit. An approach in this direction will be well worth the saving in losses brought about by reduced transformer sizes, particularly where large numbers of transformers are concerned; this approach whether it be on the matter of transformer rating or rating and size of other apparatus, all tends to bring about standardisation and savings, without undue sacrifice of reliability which are essential if a start is to be made in developing sparsely populated areas.

I was pleased to have Mr. Sibson's reaction to the use of single phase supplies for rural electrification, where the consumers load factor usually can be expected to be very low. In support of a single phase supply in such cases it should be more generally realised that single phase motors, giving reliable performances, can be obtained in a very wide range of sizes up to 15 h.p. By the nature of their use, namely for individual duties (and not on production lines) such motors are usually arranged for off load starting and the problem of starting currents are not as serious as is sometimes implied.

On the matter of earthing in rural areas, Mr. Sibson has been fortunate in being able to drive the rods referred to

down to a depth of 12 feet. In our urban area it would not be possible as a general rule to get a depth more than 3 feet. However, the method described by Mr. Sibson, and the results obtained by him indicate that more use should be made of earthing by this method, especially as in rural areas the area served can be expected to be reasonably close to a river, or a fertile valley and thus be free of rocky formations or rocky layers near the surface.

The Paper only touched in the briefest manner on the costs and tariff problems. Mr. Sibson has very aptly described the difficulties which confront us if we are not careful in forecasting probable development in an area, and I agree that the practice of "refunds" to consumers, who were originally connected, should be avoided at all costs.

The formula used by Bulawayo is worthy of further serious study, bearing in mind that Mr. Sibson has pointed out that there are limitations to its use. The use of A (area of roperty in acres) in the formula is most important and it should be noted that the results E, the hypothetical financial burden, is used to determine proportionately the connection and minimum charges to each consumer. I am led to understand that the Undertaking's standard Tariff of Charges would be applied, once the connection and minimum charge, as arrived at by the formula, had been fixed.

Reply to Mr. Green (V.F. and T.P. Co.):

Mr. Green has rightly stressed the vastly different conditions obtaining in South Africa, and in this connection it is possible that the false hopes, raised as a result of unfavourable comparison with rural electrification in other countries, will no longer occur and a more sober approach to the desirability of reticulating to sparsely populated areas will result.

It is also evident that the Social and Economic Planning Council have been giving this matter their attention, as subsequent to the Convention in May, the Council set out in its report the conditions necessary to bring about supply at reasonable cost to rural areas. It does not require great study to arrive at the fact that unless costs are subsidised, the only rural areas which can be economically developed are those which are adjacent to the major South African towns and power stations, and a tally of these will surely make one realise the enormous remaining undeveloped and for that matter, unpopulated area.

I was particularly pleased to hear Mr. Green mention that a relaxation of regulations governing overhead lines was being looked into, and that a S.A. Specification for 11 kV overhead lines using wood poles, somewhat similar to B.S.S. 1320, was proposed. The relaxation of wind loading to the figure given by Mr. Green should make a considerable difference in the cost of light overhead lines, and by the same reasoning, a wood pole of greater butt thickness than at present obtainable from the Department of Forestry would enable longer spans, with further economies, to be used.

This now brings me to the question of pole strengths and to the figures quoted thereon by Mr. Green. At the outset I would clearly state that I am in complete agreement with the figures quoted by him, but in approaching this question for the Paper under discussion, I felt convinced, and still do, that the Electricity Undertakings in South Africa were not getting poles of sufficient strength and length to really encourage their extensive use on economic grounds.

I am reliably informed from several sources that large numbers of untreated strong timbered wood poles, of butt diameter of 10 inches and bigger, are available annually from private sources which up to the present appear to be untapped as far as our industry is concerned. Presumably the reasons for this can be explained by the owners of such private sources not being encouraged to treat the poles before sale, or possibly it is because a more remunerative market is obtained for untreated logs.

In this connection it is of interest to note that a committee to report on afforestation and lumbering was recently formed, and will by now have reported its findings. The results of these investigations may be of considerable interest to the Electricity Supply industry which, I feel, should have "staked" a claim for the future, if this was within the scope of the Committee's duties.

As regards the modulus of rupture of 9,000 lbs. per square inch, quoted by Mr. Green, as being laid down by the draft specification for creosoted wood poles (Peniculata), I am inclined to the view that this value is in fact too low. The data published by courtesy of the Department of Forestry show that in seventy-five test cases on Peniculata poles grown in the Cape Midlands and Natal the *minimum* value for modulus of rupture was 12,200 lbs. These results are stated to have been arrived at from results of actual tests on poles dried out to a moisture content not exceeding 30 per cent. Furthermore, it should be noted that the larger the diameter at the fulcrum the larger will be the margin of safety, because, generally the larger poles are older and therefore stronger than smaller ones. With this information available and taking due regard of the high factor of safety, there would appear to be ample justification for increasing the value of 9,000 lbs. given in the Draft Specification.

Using the figures quoted by Mr. Green, namely,

Butt diameter—9 inches.

Modulus of Rupture—9,000 lbs. per sq. in.

then minimum load to cause failure under the conditions quoted by Mr. Green for the draft specification, is 1,920 lbs.

Now by using the same formula, e.g.,

$$\frac{W-fI}{y \times L1 \times 12} \quad (L1\text{—Lever arm})$$

it is similarly shown, with figures used in the Paper for the reasons given in the foregoing, that for a 10 inch butt diameter the load to cause failure is in fact 3,430 lbs. and using a factor of safety of 3.5, the working load arrived at is 982 lbs. as stated in Table IV of the Paper.

It will be seen therefore that the figure of 982 lbs. comes about by the use of a modulus of rupture of 12,000 lbs. per sq. in. and a 10 in. butt diameter; either one or both these conditions would bring about further savings in costs. The matter of reduction of costs, was, it will be recollected, stressed in the Paper under discussion.

Similarly, by using the working load given in Table IV, but not allowing for loading due to the deflection of the pole, the maximum wind load span, subject to conductor to ground clearance, can be shown to be 828 feet.

In concluding my reply to Mr. Green, I would add that his detailed questioning of the pole strengths has served a most useful purpose in that it has enabled me, in reply, to show possible further savings in cost. Also in view of the time limit imposed on the duration of the Paper, a detailed explanation of the figures used was not possible.

Reply to Mr. Milton (E.S.COM.):

I am grateful, as I am sure we all are, to Mr. Milton's reference to the Commission's approach to the form of Tariff in respect of rural consumers grouped in an area. It will also be seen, in a later contribution by Mr. Sibson (Bulawayo), that his formula is based on the same reasoning as advanced by Mr. Milton, namely, that for a given area there should not be any differentiation on the basis of distances measured from the "centre of gravity" of supply to that area or particular locality. Mr. Milton has explained in detail the reasons and advantages of this method of approach which no doubt has proved itself, otherwise the Commission would be seeking other formulae.

Mr. Milton has referred to the fixing of a minimum charge, determined by an examination of the cost to give supply to the particular consumer, and at the same time applying the normal Tariff.

In this connection and for the benefit of the smaller municipalities, I would commend, as I have done in the past, this method for their use when dealing with "isolated" reticulation to consumers, who may be say 600 to 1,500 yards away from the nearest supply, and when the cost of giving supply to such consumers is, relative to the size and finances of the Undertaking, quite large.

I have looked into the figures quoted by Mr. Milton giving the rural development in the Cape area and I cannot help commenting on the averages derived from these figures. The averages are extremely high, or appear to be for a rural area, as for example:—

Avg. Units per month per consumer—9,457 Units.

No. of consumers per mile of H.T. Line—3.5 Consumers.

∴ There is one consumer per 503 yds. of H.T. Line.

∴ To use 9,457 Units per month at say 25% load factor the consumers *demand* is approximately—52kVA.

It seems evident that the averages arrived at are increased by the fact that there are possibly several large industrial users in the 608 consumers quoted by Mr. Milton. The assistance to development by users was specially mentioned in the Paper. I would in concluding this reply refer Mr. Milton to Mr. Eastman's communicated contribution and my reply thereto.

Reply to Mr. Muller (Bloemfontein):

It is evident that there are several matters, arising out of the Paper and the discussion, which have been of interest to Mr. Muller, who it seems is actively engaged in making rural extensions.

On the matter of earthing I cannot add to comments appearing in the reply to Mr. Sibson, who appears to be satisfied with their use in the Bulawayo area.

As regards the estimates and approach to anticipated load in an area, Mr. Muller has raised, and rightly so, the most difficult part of a contemplated extension, the cost of which, at any stage of its planned layout, should be justified.

In my opinion the correct anticipation of load in an undeveloped area, is a measure of the "business acumen" or instinct of the engineer concerned. I would further add that a general rule for national application is not possible and that the best qualification for estimating load in such cases is a sound knowledge and experience of the habits and the wealth of the people in the district, backed by an intelligent interpretation of the many signs and events which will indicate current and future possibilities of the area. Responsible public opinion, especially as expressed by people who know the area in which they have lived for many years will add to the pros and cons of an approach to an estimate of load.

One point however does appear to be worthwhile mentioning and that is on the matter of the period of the loan, which is required to do the work in question. As the usual loan is for a period of 20 years no good purpose can be served by even attempting to estimate loads and requirements in excess of this period. Furthermore, it might well be that 6 or 7 years of this period will elapse before say 60 per cent. of the possible consumers are connected. Again, should very rapid development occur, then the assets will be rendered obsolete before the expiration of the loan period and in such cases, increased annual contributions, resulting in an increase in charges, will have to be made to the Reserve Fund.

The foregoing will serve also to show the many problems and difficulties to be overcome, and which I am sure Mr. Muller had in mind when he raised this matter.

I would agree with Mr. Muller that the best approach, subject to the various factors already mentioned, is to estimate requirements and design the extension as a whole, and to carry out the development in units which in the first instance need not be economic if future development is assured. By this I mean that the first portion of the programme, representing say 15 or 20 per cent. of the whole, might very well, as a matter of

good policy in the judgment of the Undertaking's Administration, be run at a loss, such losses being carried forward until the forthcoming profits cancel them.

On the matter of the wood poles, I would refer Mr. Muller to my reply to Mr. Green, where I hope he will find the information he wants. In that reply Mr. Muller will note that the Department of Forestry is not the only source of supply for wood poles.

As regards the use of the capaciter starting, and presumably the capaciter running motor, I agree with him that this is a sound job which should prove reliable for single phase supply but I understand that in general service use, such as on forms, the condenser has proved unreliable. No doubt this trouble will be overcome.

In concluding my reply to Mr. Muller, I would emphasise that I am in complete agreement with the principle that the ownership of the lines should be vested entirely with the Supply Authority, and with this approach, there should be no need to request cash payments from the consumers concerned and thus avoid all the complications and difficulties such cash payments bring in their trail.

Reply to Mr. Wilson (Pretoria):

Some two years ago Mr. Wilson was able to gather material for a very informative Paper, read at the Durban Convention last year, and in that Paper touched on the practice in America in regard to rural supplies. His reference, therefore, in favour of single phase supplies to rural areas for both domestic uses and the limited motive power requirements would seem to indicate that he is satisfied that single phase motors, when taking total cost into account, are more competitive and just as serviceable as the 3-phase motor.

I am grateful for the information Mr. Wilson gave on his experience of the life of wood poles. It is interesting to note that the poles after 17 years' service have been put into service again.

The reference to wayleaves and rights of way and the difficulties referred to by Mr. Wilson in this connection, in areas ready for supply, is a matter which might well receive the attention of the next Convention, with a view to adding weight to the need to bringing about a legislation designed to assist and benefit the majority in such areas or regions.

Reply to Mr. McDonald (Pietermaritzburg):

I am not quite clear what Mr. McDonald has in mind regarding increased capital cost of plant as compared with pre-war costs and his implication that industry is not paying its fair share of the cost of electricity generally, and as stated in my reply to Mr. Muller, the Undertaking concerned should own the project—capital contributions from consumers should be avoided.

I cannot associate myself with the view or the policy that any industry should be "bribed" by way of preferential tariffs, to start operations in any particular area. The cost of electricity to a potential industry has practically no influence whatsoever on whether that industry is to commence operations in an area. It will be invariably found that in the course of many enquiries and problems to be overcome by an industry, the question of cost of power is one of the lesser items to influence a decision as to site. That industry's decision will undoubtedly be guided in the first instance by market, distribution, raw materials and labour and transport before attention is given to water and power. Again, as a first approach, the industrialists realise that the cost of power to them is rarely more than 10 per cent. of their production costs; usually it is in the order of 5 per cent. or less, and if one is inclined to believe the industrialists usual approach on the matter of power costs, then that Undertaking will undoubtedly be in for a troublesome time.

In other words industry must pay its share of costs from the time supply is taken especially as there is never a guarantee given that a steady increase in

usage will occur, say in the order of a regular 10 per cent. per annum. On the other hand, when dealing with projects for supply to Townships and where an annual increase in the order of 10 per cent. or more is expected, then there is every reason to reduce charges and carry the losses forward with the knowledge that they will be eliminated by the forthcoming profits.

Also with regard to industries or other consumers with objectionable loads and poor power factors, there exists the means and methods to overcome these, as for example, a large flash butt welding load. The Standard Regulations for the Wiring of Premises give Undertakings the right to place a lower limit to power factor, even if this is not automatically a penalty in the standard tariffs applicable in an area. As regards the large fluctuations of load from a flash butt welder, the user as well as the supplier are fully aware of the consequence of arc loads and that being so the user must interpose a motor generator set, with flywheel, between the load and supply, irrespective of what part of the country the user desires to instal his plant.

The references in the Paper were made on the assumption that all classes of consumers met their fair share of costs and with this in mind, despite Mr. McDonald's views, the supply industry must take heed of the impact, still to come, of higher capital charges. These charges, as implied in the Paper can only be offset by a corresponding increase in load factor resulting in larger sales of units over which to spread costs.

The fact that the pre-war 1d. today has only a purchasing power of ½d. should be ample enough warning to take heed and prepare in advance to overcome problems that are bound to come.

Mr. Eastman (Cape Town): (Communicated):

Whilst standardisation of voltages and equipment for Rural Development in any one area is essential from the standpoint of service, it does not necessarily follow that the same pressure of supply and design of system in that area is suited to another in which, possibly, climatic conditions and the purposes to which the supply is put by consumers may differ from the former. Circumstances may change soon after the supply has commenced in the way that is now taking place in part of the peri-urban and rural districts near Cape Town where land which hitherto has been used exclusively for agricultural purposes is now being sub-divided on a large scale for high-class suburban residential purposes. Also changing circumstances may make it necessary for farmers to change their type of farming operations thereby altering materially the load and energy requirements in an area. It is submitted, therefore, that just as is done in urban and surburban areas development in rural districts should be planned in such a way as to provide at minimum expense for supplies on a scale greatly in excess of the loads offering in the first place.

In Cape Town this outlook is put into effect by installing 3-phase 380 volt supplies to all rural consumers from pole mounted step down transformers of 5, 10, 25 or 50 kVA output connected through air break switches and fusible drop out fuses from overhead 12,000 volt line. When development takes place to an extent such as to exceed the loading capacity of a 50 kVA transformer a substation for supplies in the immediate vicinity of 380 volts is established on the ground with the requisite larger size of transformer. As an example of the change in load that can take place with a change in farming operations, one might mention that a farmer whose principal activities in the first instance were grape growing and wine farming and whose connected load then was 6.8 K.W. now requires 39 K.W. of actual load because the export trade in grapes fell away during the war and this part of his activities were changed to dairying. An additional 40 h.p. motor will be installed on his farm shortly.

Creosoted wooden poles supporting 12,000 volt transmission lines have been used in this area but only in places where there is no danger from forest or grass

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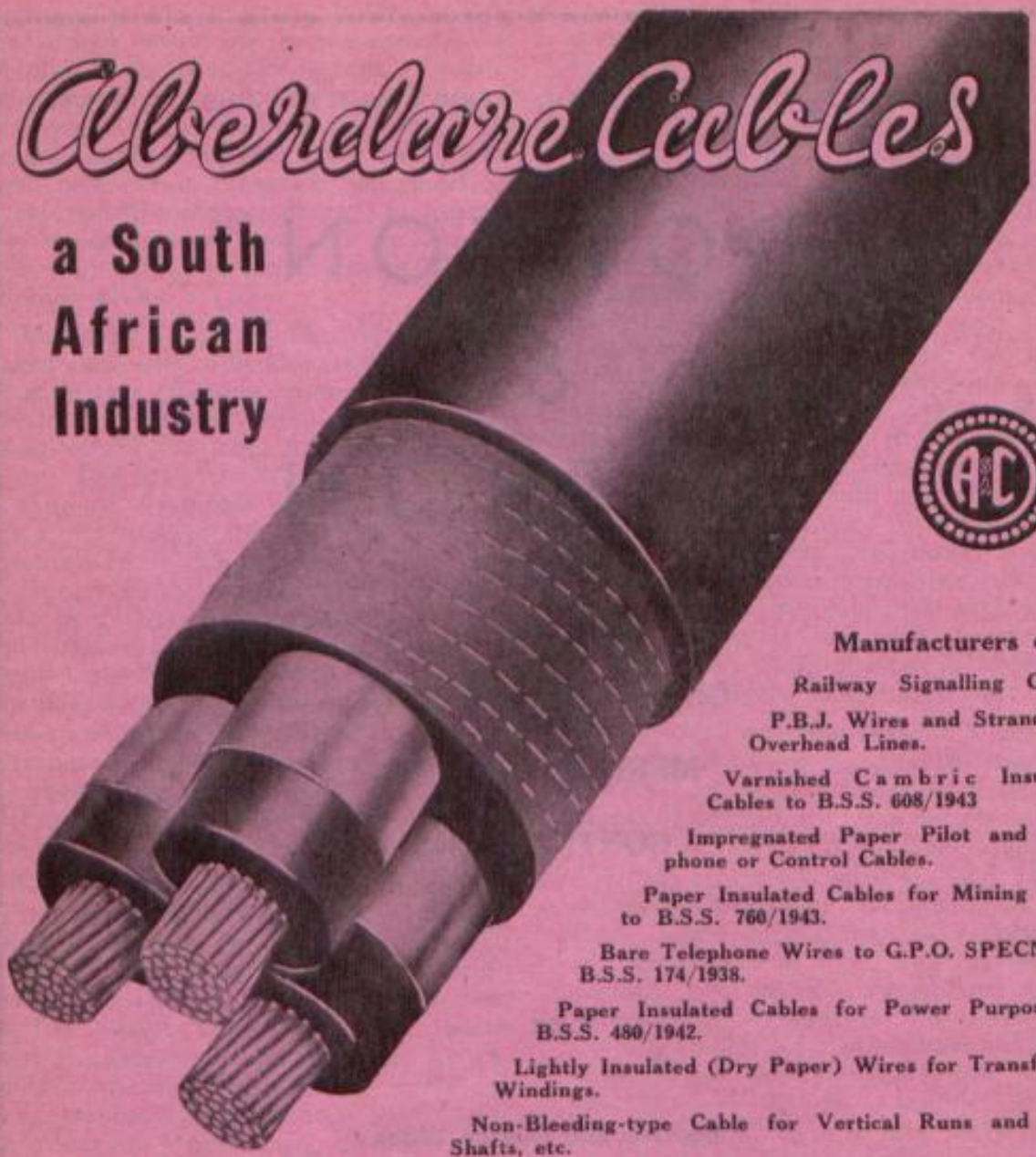

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or bush fires over the route. In such cases as for example along the slopes of the mountain range leading to Hout Bay it is necessary from these considerations alone to use steel poles. It is felt that in general steel poles are better suited to the climatic conditions obtaining at the Cape than wooden poles. Difficulty is being experienced in obtaining from the Government Forestry Department creosoted wooden poles as a reserve to those now in use and no guarantee can be obtained as to when they will be delivered.

Reinforced concrete poles are being used to a small extent in the Cape for low voltage and also for 12 kV overhead lines, but experience hitherto shows that there is little or no saving in ultimate cost as compared with steel poles because of the additional cost involved in transportation and handling due to this greater weight.

Local conditions may well also determine the class of insulators to be used. This applies particularly to the use of Extra High Tension lines near the sea coast or in places where they are exposed to salt-laden winds playing over sandy or dusty areas. Under such conditions it may be necessary to use insulators rated for use on twice or more times the rated working voltage.

Mr. Andrew's reply to Mr. Eastman, Cape Town: (Communicated):

I was pleased to have Mr. Eastman's contribution in which his experiences in the Cape rural area are considered a most useful contribution to the Paper's discussion.

The reference to standardisation of design and apparatus as between one area and another will add that note of warning to the general rule and also serve to emphasise that experience of condition over a large region with varying climatic conditions, which is a necessary preliminary before embarking on the spending of large sums of money.

In my reply to Mr. Muller I added to the brevity of my Paper on the matter of standardisation and approach to a project.

The extensive Cape area, ranging from coastal belts to mountain areas, must undoubtedly present many and varied problems before arriving at satisfactory solutions to ensure reliability of supply and minimum maintenance.

The changing circumstances, that is sub-division of farms into building lots referred to by Mr. Eastman, is to be expected in any peri-urban and rural area, the difficulty is of course to estimate when and at what rate that change will occur. It seems evident that in the Cape area the progressive change from farm to small holdings and then to high class residences is remarkably rapid, bringing, as it naturally will, a very steep overall load increase. The rapid load increase is borne out by the figures quoted by Mr. Milton and commented on in my reply to him.

I agree that the conditions as explained obtaining in the Cape area warrant the immediate use of a 3-phase supply, but I would suggest that these conditions, as supported by Mr. Eastman's figures for the grape and wine farmer, were outside the scope of the Paper under discussion.

I am not sure how long the Cape rural system has been developing but I would estimate say fifteen or twenty years, which probably corresponds to the period of the original loan raised to carry out the work and that in the Cape area the necessity to provide for accelerated rate of growth of load coincides more or less with the redemption of the original loans. In view of the competitive and attractive tariffs obtaining in that area, as proved by the great use to which electricity is put, it would appear that in any case the original loans have served their purpose and that the system is not unduly burdened with capital charges on account of plant obsolescence.

On the subject of wood poles, I would refer Mr. Eastman to my reply to Mr. Muller, and in regard to the danger of these poles from forest fires, I agree that this is a factor which must be taken

into account. But as regards grass and bush fires, we are informed by the Forest Department that there is no need for great concern and support their statements by a series of tests made with cresoted poles.

PRESIDENT:

We are making very good headway and I think we will adjourn the meeting until tomorrow at 9.30, when we shall deal with the discussion on Mr. Giles' Paper and the balance of the items which appear on the Agenda.

The Convention adjourned at 4.50 p.m.

The Convention resumed at 9.50 a.m. on FRIDAY, the 14th May, 1948.

PRESIDENT:

Gentlemen, it is very pleasing to see the happy spirit this morning and I hope you will excuse us being a little late. Your Executive had a few matters to clear up.

I am very pleased to state this morning that His Worship the Mayor will be here at 11.30 to close the proceedings, so that will give us time to clear up one or two outstanding items.

Statistical Tables have not been completed, but your Executive will deal with that at the next Executive Meeting, i.e. the standardisation of these tables to line up with the Blue Book and the Government Returns. There is quite an amount of work involved and Mr. Kinsman will get busy again and I hope the Executive will have the Report ready for the next Convention so that it can be presented to you in its final form.

Some delegates yesterday expressed the desire for a copy of Mr. Clarke's Paper on the Meter Testing Code. Well, as you know, this will appear in the proceedings but we do not want to wait until the proceedings are printed, as that takes some considerable time, but Mr. Ritchie has informed me that the requisite number of Mr. Clarke's Paper will be sent to our Secretary and he will pass copies on to all members of this Association for their information.

As I remarked earlier when the first Paper was presented before this Convention, I would like to have the feeling of this meeting with regard to the number of Papers to be presented. Many of us who have attended these Conventions in the past are aware that we had perhaps three or four Papers, and together with the discussions thereon, it necessitated rushing things through without giving due time for discussion on the Papers. At last year's Convention, we decided to cut the number of Papers down to two at this Convention, and I think that has given ample opportunity for everybody to take part in the discussions. Is it your feeling, gentlemen, that we have two Papers at the next Convention or more?

Mr. MILTON:

I have urged for many years that Papers should not be read but circulated beforehand with a statement that they will not be read but will be open for discussion. If you do that I think three Papers on important points would be very valuable.

Mr. SIBSON, Bulawayo:

I would like to support that. I entirely agree.

PRESIDENT:

Is it the consensus of opinion that we have three Papers but that the authors of the Papers present them in précis form and leave greater time for discussion?

Mr. FRASER, Johannesburg:

I would like to suggest that two Papers would be sufficient. I agree with Mr. Milton that they should not be read, but I think that the authors of the Papers should be given an opportunity to give a brief resumé of the Papers.

Mr. VERGOTTINI, Brakpan:

I would support that and I would like the reports of sub-committees to be circularised prior to Conventions as well. Take the Paper on the Meter Testing Code read at this Convention and adopted that has to be circularised *now*; if this was done first we would now have known more about it and perhaps have had a more practical discussion on it.

We had the same thing at Pretoria with the Standard Regulations for the Wiring of Premises. It was only after these were circularised throughout the Union and after everybody knew more about it that it was finally adopted.

PRESIDENT:

I think you will appreciate that it takes a little time to get them printed and these meetings take place frequently on the Rand, but it may be desirable to get them printed as much up to date as possible and the balance to be presented to you by a representative.

Cr. HOLTZHAUSEN, Potchefstroom:

I would like the Papers circulated in both languages. I think my English-speaking friends would agree with me that if they had the Papers in Afrikaans it would be very difficult for them and if the Papers could be circularised in both languages it would help a lot. I would like to propose that.

PRESIDENT:

We will make a note of that and discuss it at the next Executive Meeting.

Several members have expressed the desire to visit the West Bank Power Station of the Electricity Supply Commission at East London. I would welcome any member of this Convention visiting the Power Station, if time so allows them, this afternoon or at any time during office hours.

There is another formal matter; that is the appointment of auditors. Your Executive has decided to change their auditors. Messrs. Warren & Hofmeyr were our auditors in Pretoria for some years past and due to Mr. Taylor and the Executive being in Johannesburg—the major number of them anyhow in Johannesburg—it has been decided to have auditors in Johannesburg, and as Messrs. Savory & Co. have agreed to accept that office, the Executive recommend the appointment of that particular firm. Are you all agreeable to the change of Auditors?

MEMBERS:

Agreed:

PRESIDENT:

Well that, gentlemen, disposes of all the minor items. We adjourned yesterday on Mr. Giles' Paper and some discusion took place. I don't know whether there is any further discussion to take place on that particular Paper; if not, I would like Mr. Giles to reply to the points raised. Are there any further remarks on Mr. Giles' Paper before he replies? There appears to be no further discussion so I will ask Mr. Giles to reply as far as possible to the discussions which took place yesterday and the balance will be replied to in the record of the proceedings.

Mr. GILES, East London:

Gentlemen. Yesterday, Mr. Milton, in opening the discussion for which I was very grateful, mentioned that in the Paper there was an underlying feeling that eventually price levels will drop. Well I must say that I feel that price levels will drop because of the economic forces and the artificial position created by the very low value of money throughout the world. Eventually something must happen. It is not for me to make any suggestions as to the forces which will operate, but eventually I feel that prices will come down, we all hope gradually rather than by the very drastic means of a slump.

Mr. Milton particularly drew attention to the method of estimating the operation

and use of the turbo-alternator and asked for a little more information on the letter "A" in the formula. This element "A" has been based on interest and redemption charges of 5.75 percent. total on purchase prices of machines evaluated on an average straight line law whereby a 10,000 kVA machine costs £80,000, the purchase price of a 15,000 kVA machine is £108,000, and that of a 20,000 kVA turbo-alternator, is £128,000. The element "B" does not include an allowance for depreciation but consists entirely of the labour costs of operating and maintaining the machine. The figures were shown after some consideration from cost records available to the author. The element "C" is the full cost per unit generated.

With regard to the losses in the cables, I have worked on the concept that the losses go along with the current and, therefore, if you buy current from a supply authority or even if you have your own power station, you still should value this loss on the basis of a kVA charge and a price per unit. In the Paper, the kVA charge has been taken at £4. 3s. 6d. and the price per unit at .3 of a penny. The ratio of the average current to the maximum has been taken as 1.2 at a 50 per cent. load factor. I think these are conditions typical of East London.

In regard to Mr. Andrew, I was very grateful to him for drawing attention to the enormous cost of labour in the finished product. Many of us do not realise that the iron ore is won from the ground, the coal is also brought from the ground and both have to be handled, transported, worked and the final cost is a tremendously high figure because of the number of hands through which the article passes. Electrical plant on account of its extreme delicacy in some parts, and the special materials which have to go into its assembly, demand a highly skilled worker at a high wage, and a high price results.

Mr. Andrew also pointed out that there was the factor of voltage drop to be considered. If Kelvin's law is applied, the voltage drop is reasonable. He also mentioned that the normal current rating of the cable had to be considered and this has been done in the Paper. He referred also to the short circuit current rating; it is not very essential to consider this because the short circuit rating is only required when you have a small cable from a large transformer or generating station and it was left out so as not to confuse the final aspect.

With regard to Mr. Sibson, I think his was a very valuable contribution because he emphasised very strongly the loss in the value of money. That situation is beyond us as engineers; we can only cope with it when its impact has to be measured in the financial results of the undertaking. Unfortunately those results are only evident towards the end of the year when the estimates and other financial matters are under consideration and one is apt to suddenly find that the price of the sale of units has gone up considerably.

I agree, of course, with Mr. Sibson that there are other considerations like steam conditions which are to be considered and dealt with but I was asked to deal with this matter purely from a financial aspect and the practical considerations, such as the load curve, initial load, steam conditions, haulage capacity of the S.A.R. were taken as being settled and capable of being examined from a financial aspect. As regards Kelvin's Law the results are vitiated once duplication of cables is made a consideration.

Mr. Eastman was kind enough to rise as soon as he heard mention of relief of rates and I think that that is also an important matter. I have Councillor Tiddy in front of me and I do not want to say too much about this subject, but it does give point to the necessity in these days to plough back, as he so aptly said, any surplus that is available, and presumably Mr. Eastman would bring into being a special fund such as a "Rates Equalisation Fund" in order to hold this money. When I was very much younger I read a book on Henry Ford's Life, and the basis of his success was that he

ploughed back his profits into the business, and if the Electricity Departments could do that we would have more substantial undertakings in the financial sense than we have now.

With regard to Mr. Muller, I was very pleased that he mentioned the question of continuity of supply. That is a very difficult subject to handle from the financial aspect and I believe special tariffs have been evolved for the proposition. I understand that the Victoria Falls Power Company accept a penalty for non-continuity of supply. I thought I would keep the matter as simple as possible on the basis that it would not be practicable to handle loads of 60 megowatts with one machine, and for that reason only I left out the practical consideration of continuity of supply.

With regard to Councillor Erasmus, it was very refreshing to see a Councillor take part in the discussion and I must agree with him that as things are at present we must review the tariffs. There is no way out of it.

Mr. Green also raised the question of using four sets instead of three but there I feel that if he wishes to use an additional set he upsets the financial basis on which I have framed the Paper and the additional set should be costed separately; the operating costs should be added to the figures I have already submitted. I have rather dealt with this as a basic financial problem on the assumption that the practical difficulties have been resolved.

Mr. McDonald raised the question of factories with a poor power factor and what should be done about that. My own personal feeling is that a town would be very unwise to refuse the first factory of a certain industry because of its low power factor equipment. I think every endeavour should be made initially to get one factory of a type into the town even at the expense of a little additional cost. Of course once the factory is established and it either has to be sold or extensions have to be made, at that stage I presume that they can pay any additional costs and that is the time to call upon them to do so. Mr. President I think that is all.

PRESIDENT:

Thank you, Mr. Giles.

The Deputy Mayor of East London remarked to me yesterday that he felt somewhat diffident in taking part in the discussions on the two Papers presented at this Convention. He said naturally he could not speak to the technical aspect of the Papers but I assured him that we as Engineers would welcome any contribution by any Councillor on the general economic principles and Cr. Tiddy said he would be only too pleased to make some remarks on the general aspect of the Papers dealing with the matter of finance, so I will ask Councillor Tiddy to make some comments on the Papers you have had presented to you.

Cr. TIDDY, East London:

Mr. President, Madam, Gentlemen: I had as a matter of fact intended to take part in the discussion upon Mr. Giles' Paper but unfortunately I was unable to attend the main discussion yesterday afternoon and I had hoped that it was going to be part of the Agenda this morning.

The point I wanted to raise and more in the nature of a question was a point that Mr. Milton raised in his discussion on Mr. Giles' Paper. I think I am right in interpreting him as saying that he believed that the general cost structure would only come down very little or possibly very slowly and it gave me something to consider because some of us who are in trade possibly do not hold quite that same opinion, in that today we believe that this very rise in the spiral of costs is going to do exactly as it has in the past, the higher it goes the less the consumption and obviously the fewer the consumers and what happened in this country, at any rate, after the Boer War and after World War I is, I think, very likely going to happen after this war. My friend, Mr. Erasmus, who is in the wool trade, told me the other day that

fine wools were sold in this hall for 4/3 a pound. That to my mind in pre-war days cost somewhere about 1/-. That seems to be a staggering price and when the wages are worked into the finished article it will make the goods impossible for the ordinary man to buy. You are then possibly likely to get over-production and once you get that spiral down you will have the same reaction as the inflation.

You will recall just recently when you and I, Mr. President, went to Johannesburg on Council business, we motored from Johannesburg to Pretoria with a very well-known business man of this country and his advice to me as a merchant was to reduce my stocks as much as I could. He expressed the opinion that the fall in prices in Europe and America was likely to take place within the next two or three years. With our very rapid industrial development it would be longer delayed in this country and he gave it as somewhere about five to six years, but he did warn us, and I feel I must express the same warning, that that drop in prices will come and that when it does come it will be drastic and we must be in a position to meet it. I am basing it purely on history and history does have an unfortunate habit of repeating itself, and I think we must be prepared.

If we have to instal fresh equipment, fresh machinery, and if it is an urgent necessity as in our case in East London, we have got to go on with it; we have sold industrial land and we have promised power to these industrialists but whether or not it is an absolute urgent necessity, my own opinion is that some degree of action ought to be considered by councillors.

I would like Mr. Milton to make any comments on this if he will because he is dealing with machinery on a very large scale and his opinion, if he could enlarge on that statement to me, must obviously be of very great interest to us here.

This is the first opportunity I have had to attend a Conference of this kind, the reason being that this is the first year that I have been Chairman of the relevant Committee, but may I say at this stage how very much I have appreciated attending this Conference, how very much there is for the layman to learn in coming to such a Convention and I would urge all those Electrical Engineers of municipalities to endeavour to persuade their councillors to allow their Chairman of Committees to accompany them on such delegations. There is so much to learn and it makes his position so much easier if he gets an intimate knowledge of the views of Electrical Engineers and other technical advisers in this country. I do think it would help municipalities in a long-term policy.

There is one highlight of this Conference which has appealed to me and that is the Valedictory Address given by the retiring President, Mr. Kinsman. May I say, with all due deference to what has gone on since, that that was an outstanding contribution to this Convention. The views he expressed were of vital interest to us whether we are commercial men, electrical engineers or serving the public as councillors, but the general principles he enunciated applied to all walks of life today. He stressed the essential desire to develop initiative in the young apprentices and young employees you people employ. I want to give you, before I close, an outstanding example of initiative that was set by your President today and Mr. Giles recently in the very heavy rains that we had here. Through no fault of their own there was very grave danger of our power station being flooded. The water was creeping up and up nearer to the machinery on the floor of the power station to such an extent that our City Electrical Engineer had to face one of two alternatives. I think the water was two or three inches below the machinery. Mr. Foden was then placed in this dilemma. He could shut off light and power to the whole town in order to save the machinery; alternatively, he could redouble his efforts to try and stem the rising waters and thereby continue to give the town that service which they really demand and which he obviously must be very loath

to withdraw, because in shutting off all light and power at that stage it could bring about immense inconvenience to us all. He took the bolder course, he decided to redouble the effort to stop the waters and I am very pleased and proud to say that he succeeded and he has earned the grateful thanks of East London. That is initiative and that is what Mr. Kinsman is trying to encourage in that Paper of his.

I hope I have not taken up too much time, but once again may I express my gratitude for the opportunity to attend this Congress.

PRESIDENT:

Thank you. It is reassuring to hear comments from councillors.

I would ask Mr. Milton to reply if he cares to do so, seeing that our Deputy Mayor specially asked for that.

Mr. MILTON:

Dealing with the question of costs, I sounded a note of warning to the effect that I did not think they would come down immediately. I explained my reasons for that statement, and pointed out that in the past we had bought material erected in this country at less than factory prices.

I hold the view that price levels generally may fall, and in some commodities they are sure to fall very appreciably because they have been based on a great demand for a scarce commodity, with no control other than the laws of supply and demand.

Insofar as our plant and equipment is concerned, however, I do not think the price levels can be regarded as having been based on an exceptional margin of profit.

Having in mind, therefore, that the prices which we pay today are to some extent controlled prices, those price levels are not likely to fall appreciably even in a time of depression. The post-war effects of the 1914/1918 war may well be studied. The prices paid after the 1914/1918 war were at a level, which was maintained substantially until we "went off gold." There was a change in price levels at that time, and the general tendency from that time—has been an upward one. Naturally these price levels are not constant but they do not fluctuate to any great extent until there is an appreciable step, and that step has always been upwards, and so I think I am justified in passing the remark I did.

There is another important aspect of the problem we must not overlook. Whilst prices may be high if the cost of operating an electricity undertaking is analysed, it will be found that capital charges (which are the costs arising from capital), only represent a relatively small portion of the total cost for a year—from 20 to 30 per cent. probably. A substantial change in the purchase price of plant and equipment is not a very serious increase as a percentage of the total cost of production. On the other hand the cost of wages forms a relatively large proportion of the total of annual cost; they usually exceed the capital charges by a large margin. The increase of the latter charges are usually permanent, because it is very difficult to alter wages once they have been established at a higher level.

I hope I have covered the ground required by Cr. Tiddy, and in conclusion I would point out that you cannot compare the ordinary every-day commercial products, handled by merchants, in their price fluctuations with the price fluctuations of the large items of plant and machinery we instal (except in the cases of say copper and lead), because they are controlled by vastly different factors.

Cr. TIDDY:

May I thank Mr. Milton for what he has just told us. I think that this is one of the highlights of this Convention because he has given me, as a commercial man, the necessary outlook I required in relation to electricity undertakings and I think it was a most enjoyable reply and really worth while raising at this stage.

PRESIDENT:

We will now adjourn for tea and resume at 11 o'clock to deal with the final item, General, before His Worship the Mayor comes along to close the proceedings.

The Convention adjourned at 10.25 a.m.

The Convention resumed at 10.55 a.m.

PRESIDENT:

I have a request from Mr. Sibson; he would like a few words in explanation of a point raised by Mr. Milton.

Mr. SIBSON, Bulawayo:

I wanted to take this opportunity of explaining something in connection with Mr. Milton's comments on the formula which I gave you that we have adopted for allocating the proportion of capital expenditure between rural consumers who have farms or allotments which vary in size.

Mr. Milton referred to the employment of the function of distance from some point, and he said that in dealing with any particular area the distance of each consumer from such other point should not be considered, but that area should be considered as a whole. I omitted in my introduction of this matter to explain that this is, in effect, what we do. We do not, in applying this formula, usually employ the distances between each individual consumer and the central point. A sufficiently accurate result in respect of a particular area, provided it is not too large, can be obtained by taking the centre of gravity of such area as the point of supply and applying the distance from the central point so obtained to the formulae for all the consumers in that particular area. The reason for this is, of course, the difficulty of exact measurement of distances and also the fact that, in any case, where a given area contains a fairly large number of potential consumers, the distance factor contributes such a small amount to the individual hypothetical costs, by far the greater proportion being produced by the square roots of the areas.

Thank you very much, Mr. President.

PRESIDENT:

Thank you, Mr. Sibson.

We now come to the final item, General, gentlemen. Mr. Milton would like to make some remarks which will be of interest to many of us and that is in connection with the cost of fuel oil. I now call upon him to address you on that subject.

CRUDE OIL

Mr. MILTON:

Thank you, Mr. President. In connection with the recent increase in the price of petrol, there was a concurrent increase in the price of crude oil. Crude oil went up by 2d. per gallon, just as petrol did. The incidence of that 2d. is severe on the cost of operation of crude oil stations. Whilst the Commission feels the increase in the cost by 2d., I would stress this point on behalf of the large number of municipalities operating crude oil stations. It seems strange that, when the prices were increased, the Minister ruled that paraffin should not be increased in price, because the Government did not permit any increase in the price of power and illuminating paraffin due to the fact that any increase in the price of these two commodities would ultimately affect the cost of living. It would seem a very vital omission has occurred in not stating that crude oil costs should also be relieved of any further price increase. (Prices increased considerably during the war years).

If you examine the effect of 2d. per gallon on the cost of crude oil in many municipal undertakings you will find that it is far in excess of the Price Controller's increase of 1/3 per ton in the cost of coal. In the towns near the seaboard—I am speaking from memory—the cost of crude oil was 4d. to 5d. a gallon. That price, through increases in railage and other increases during the war years, rose to a matter of 9d. or 10d. The

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further 2d. therefore is not as small as it might at first appear. Provision was made for a 10 per cent. increase generally in electricity tariffs by many of the smaller undertakings to cover the increase in cost of crude oil, but that 10 per cent. has been insufficient in most cases and the additional 2d. may lead to a further 10 per cent. increase in tariffs. I feel the matter is so important to such a large number of your members, Mr. President, that I suggest that the Executive be asked to take this matter up with the Minister with a view to abolishing the 2d. increase.

PRESIDENT:

Thank you, Mr. Milton. You have raised one very pertinent point and I think that this matter should be taken up by the Executive of this Association. Thank you for that suggestion.

Are there any other comments on that particular subject? Are there any other points now Madam, Gentlemen, while I am waiting for His Worship the Mayor, under the heading of "General?"

Mr. E. L. SMITH, Boksburg:

Mr. President, at the last Convention in Durban a resolution was passed to the effect that Building Control should be abolished more particularly in relation to the Public Utility Advisory Board. I would like to re-introduce it and put forward the same motion, that this Advisory Board, which has already served its purpose, is no longer justified and now that an election is pending it might have better results.

PRESIDENT:

You have heard the motion before you, is there a seconder?

Mr. ADAMS, Oudtshoorn:

I have very much pleasure in seconding it.

PRESIDENT:

I put that resolution to the meeting. All those in favour?

(The resolution was passed unanimously).

PRESIDENT:

I am a little pessimistic in that respect but I will put forward your wishes. Any other points under "General?"

Mr. E. L. SMITH, Boksburg:

Mr. President, I wish to draw the attention of this Association to the tendency of some Reef town councils of placing the administration of the Electricity Department under the Town Engineers. We have had two or three cases recently, and the Reef Municipal Electrical Engineers have strongly protested against such a practice. In one case the position has been rectified, and the other is still being considered. If the Electricity Supply Commission take over high tension supply to towns, I am afraid there will be the same tendency there of placing the administration of the Electricity Department under the Town Engineer, and this Association should protest against such a procedure. I am confident that Electrical Engineers are capable of administering their own departments.

Mr. MILTON:

The Commission has frequently advised the Councils concerned that the principal duty of an Electrical Engineer lies in the administration of his undertaking, not the running of the power station.

Mr. E. L. SMITH, Boksburg:

Roodepoort only a month ago advertised for an Electrical Engineer, and in their advertisement they stated that the Electrical Engineer would be responsible to the Council, but that the Electricity Department would be administered by the Town Engineer.

Randfontein was in a similar position a few months ago, but fortunately the position was rectified, and there is a tendency for the administration of Electricity undertakings to be placed under the Town Engineers.

Mr. MILTON:

I don't know whether the representative from Roodepoort is here, but in his absence I would say that for many years his title has been "resident electrician," and he was placed under the Town Engineer, which position is deprecated.

Mr. E. L. SMITH, Boksburg:

I don't think that is quite correct. We had a meeting of the Rand Municipal Electrical Engineers, at which that particular Engineer was present, and he said that the position only came about owing to transport management.

PRESIDENT:

Any further comments on that subject? If not, is it the desire of this Convention that the Executive of this Association pursue this matter? We are on very dangerous ground, interfering with local politics.

A COUNCILLOR:

Surely in a matter like this it depends on the merits of each particular case? In some cases the employment perhaps of a very senior man in this respect might not be justified, and if a more junior type of official is employed it might be necessary to place him under the Engineer.

PRESIDENT:

That is why I suggest that we refer this matter to the Executive rather than take any action at this stage. It is a very delicate matter.

Mr. BARRATT, Graaff-Reinet:

Unfortunately the Councillor Member for Graaff-Reinet was recalled and there was one proposal I know he hoped to place before the Convention. May I do it for him? It is to this effect, that this Association sponsor the formation of a Central Board for the purchasing of municipal requirements. Secondly that falling under the above Board an Agency be created for the disposal of second-hand material by municipalities to municipalities, and that this Board issue to all subscribers a monthly bulletin listing material available. Thirdly, that the Board be financed by subscription and a small percentage on all purchases made through the Board and that subscriptions of the various municipalities be based on the rateable value of each municipality.

My Councillor Member felt that a board such as that would have very great purchasing powers; that it would assist in reducing the delivery periods of materials. Secondly, that a board like that would be able to bring to light very useful material that is often to be found lying on scrap heaps of municipalities. Small municipalities in particular would benefit, the larger would not benefit to the same extent. There is much equipment held by different municipalities, not only equipment pertaining to electrical departments, but other equipment, which is often left disused and eventually sold as utter scrap whereas, if this Board circularised the availability of such material it could indeed be put to some useful purpose. A Board of this description would be of general benefit to the whole country.

PRESIDENT:

The points raised cover a very wide field. I think it must be appreciated that we have a very small secretariat and a very nominal subscription, and if this Association were to undertake those duties we would have to have a staff of people to carry out those duties and it may mean that our subscriptions would have to be raised to meet the salaries of additional staff, and so far as advertising material is concerned, there are the trade journals in which municipalities could advertise such. I think that matter, before we take it further, should be definitely referred also to the Executive because it covers such a terrific field. Personally, I think it is too vast for this Association to undertake, that is my personal feeling, but if the meeting considers it desirable, we will have it put to the Executive at its next meeting.

Cr. BAXTER, Kimberley:

I think the matter just raised is of such importance that the decision cannot be taken by the Executive. This is a case where every municipality must be consulted. You must have the views of the Councils of the various towns. I have not got Mr. Barratt's view quite clearly, but if it is at the back of his mind that the Board should act as a purchasing commission, I am certain that my Council would oppose it. The idea is to have nothing to do or interfere in any way with the trading position outside our scope and I think, Mr. President, before any investigation or anything is done in that matter the Councillors of the various towns should be consulted and a report received from them.

Mr. EASTMAN:

Mr. President, Madam, Gentlemen; there is one point we should not overlook, and that is if this proposed Board is to be a body composed of members of our Association, then our Constitution does not permit it, because we have no power under our Constitution to act in that capacity.

PRESIDENT:

Yes, it has very far reaching effects and must be very seriously considered.

Mr. MILTON:

Might I refer you to your proceedings in this matter? This question was very fully thrashed out during the war years but it might be possible for the Executive to make available to the members the findings of the Special Operational Committee:

PRESIDENT:

Thank you for reminding me. I think Johannesburg was the first one after the war to hold a Convention; a Board was then considered and it was not carried any further.

Mr. RITSON, Stellenbosch:

The member who has just spoken, has brought forward a good idea in regard to second-hand material. You have had discussions in regard to a Purchasing Board. In my opinion this Board can be dropped.

A scheme may possibly be worked through our Secretary in this way. If a member has any plant or material for sale, he can inform our Secretary, who can then inform the members of such sale.

You are fully aware what a job it is to get certain material and some of our members may have redundant plant, etc., and can only sell to a scrap dealer; he would certainly get a better price by selling otherwise, and also help a fellow member.

PRESIDENT:

The principle is very fine. Many of us may be stuck for a certain thing when our colleague may have it 50 or 100 miles away. Anyhow we will give that matter due consideration. Thank you.

Mr. MOCKE, Piet Retief:

Mr. President, I should like to know whether any of the members have had experience in the use of the new plastic non-metallic conduit, which after some years of research and development in the laboratories of the British Manufacturers, has recently come on to the South African market.

This material is compounded with a filling which makes it suitable for use up to 200 degrees F. It is non-inflammable and resistant to practically all chemical fumes, including C.O.2 Sulphur, smoke fumes, petrol and oil.

With this new tubing it seems that the old bugbears of condensation, rust and corrosion are conclusively overcome.

I should like to know the reaction of Mr. Smith on the use of this material or any other member who may have installed it. According to reports, it has already been adopted by the Air Ministry

in Britain and is being used by a number of Municipal Housing Authorities, including the London County Council, on account of the shortage of steel conduit at the present moment.

PRESIDENT:

As far as that particular conduit is concerned, that matter has received the attention of your Executive during this Convention, and it is to go into that with the Bureau of Standards before taking any action in the matter.

Mr. RITSON:

I should like to ask the Inspector of Factories if he can give us the information "that the new P.V.C. wire has been authorised for overhead connections," and if any member can give us any information regarding this wire.

PRESIDENT:

That matter has also received very close attention from your Executive at this Convention, and the same remarks that I made in regard to Gilflex conduit I make in so far as P.V.C. wire and cable is concerned.

Mr. MILTON:

I think the point raised by Mr. Ritson is the use of P.V.C. for the service connection instead of A.M.E. The use is dependent on approval of the insulated conductor by the Government Mining Engineer. I understand that approval has been given and I think that answers Mr. Ritson's point, but I may be wrong.

PRESIDENT:

Perhaps Mr. Smith will reply?

Mr. SMITH, Chief Inspector of Factories:

Mr. President, the question of approving this wire as a "service main" comes under both Acts, that is the Mines Act as well as the Factories Act, and has to be approved by the Government Mining Engineer for lines under control of the Mines Department, but the majority of cases will come under the control of the Factories Act, in which case the approval of the Chief Inspector of Factories is necessary.

Now I will be quite honest and confess that this matter has not cropped up during my tenure of the post, but I have a suspicion that the matter was brought up for the attention of my predecessor, Mr. Joubert, and I am sorry to say that I don't know whether he has approved it or not.

MEMBERS:

He has.

Mr. SMITH:

Then why ask me if you all know?

Mr. Fraser helped me out of a hole, he said that Mr. Joubert's approval was on condition that if it is proved that the material is not standing up to requirements necessary, he has reserved the right of withdrawing his approval, which now, of course, devolves upon me, and if I receive any adverse reports on this wire, naturally I shall use the powers vested in me.

CONCLUSION

PRESIDENT:

Mr. Mayor, Madam, Gentlemen; my pleasant duty is now to welcome His Worship the Mayor to close the proceedings of our Convention. His Worship the Mayor is a very busy man and I do think we are privileged to have him here to close our proceedings. I thank you, Mr. Mayor, for coming along this morning and we do appreciate what you have done during this week and we are very grateful for it.

With those few remarks introducing the Mayor, I will now bring our proceedings to a close and I will call upon His Worship the Mayor to speak and finally close it for me. Mr. Mayor, Madam, Gentlemen, I now rise to bring to a conclusion our Twenty-second Annual Convention. It is with pleasure indeed that I welcome the Mayor to the

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final session of this Convention. His Worship the Mayor has not only his mayoral function to attend to but his business in addition. Those remarks apply equally to the Deputy Mayor, whose presence at our Executive Meetings and Convention Meetings we have appreciated and welcomed. His action indicates, I am sure, the increasing interest taken by councillors in our proceedings. In this direction I feel I must make special reference to Mrs. Councillor Stoffberg, of Randfontein, who has been so assidious in following our discussions at our meetings—we do appreciate that.

I now refer to Mr. H. L. Groom, of Roodepoort-Maraisburg. I am informed that this will be the last Convention that he will attend in his official capacity. He will, of course, be entitled to attend as a member. Mr. Groom is one of our oldest members and it is with regret that we shall say "Good-bye" and we wish him every good wish in his retirement.

I would express my sincere thanks to Mr. Kinsman, who unfortunately had to get away, and to all the members of the Executive for their kind assistance and guidance to me.

To the City Council of East London, through you, Sir, I express thanks for this Association for the entertainment provided.

Our thanks are due to the Wool Exchange members for the use of the auditorium and to the Red Cross ladies who so ably provided us with refreshments and so on. We have had a very happy time as far as refreshments are concerned.

To Mr. Taylor and our Stenographer, Mrs. Dykes, we offer our thanks for their attention to the records.

I would be lacking if I did not pay tribute to the vast amount of work that has been done by Mr. Giles in the organisation of this Convention. He has been a tower of strength to me I can assure you in the organisation of this Convention, and to Mrs. Giles in assisting Mrs. Foden in entertaining the ladies.

Also to all members of my staff of the Electricity Department and the other Municipal departments concerned, our thanks are due for their endeavours to make this Convention a success. If I have failed to make reference to any person or body who have assisted, that omission has been done quite unwittingly I can assure you. I do thank everybody concerned who has done anything to make this Convention the success I hope it has been. I, therefore, thank all who have so ably assisted me.

At this stage of the proceedings it is customary to allow speeches from the visitors and the representatives of Government Departments and so on. I now call upon those people to just say a few words. I will first call upon Councillor Erasmus.

Cr. ERASMUS, Port Elizabeth:

Mr. President, Mr. Mayor, Ladies and Gentlemen; I was deputed this morning to say something on behalf of the Councillor Members present and also to echo the feelings of the members to His Worship the Mayor and City Council of East London for the very excellent time afforded us while on a visit to the City. I, as an old resident of this City for many years, have had a busy time explaining to my old friends how and when I, as a Wool Broker, became mixed up with this pretty hard looking crew. I was challenged if I knew the difference between a KW and something else. I have now forgotten what. I said I did not know, but you were doing your best to enlighten me.

I want to echo the feelings of Councillor Tiddy when he said what an enormous benefit a Conference of this nature is to Councillor members, who are laymen. In Port Elizabeth I remember when taking over the Chairmanship of the Electricity Department I told Mr. Bradley I knew nothing about the subject and he and I made a pact to the effect that, if I did not interfere with the technical affairs of his department he would not stand against me in my election for my Ward!

Mr. President, these Conferences are valuable to us. You have had Papers delivered here, delivered by experts and couched in a language which should be intelligible to even a layman. I am afraid they did not always succeed in their tasks, because I fear we go away feeling that we know less and less about more and more, which is all to the good if all the Council members of a Committee realise what they don't know. If all Councillor and Committee Members could be made to attend such Conventions your job would be much more pleasant. There was one glimmer of hope for Engineers when it was laid down that the title of this body is an Association of Municipal Electricity Undertakers! I am sure that many an Engineer here, if not all of you, have at some time silently wished that you could act in that capacity to the members of your Committee! But, Mr. Mayor, even though we do not understand everything—and I must say I was rather worried with all these technical terms—I was happy to know that East London has set a very high standard for these Conventions and we are rather trembling as to how we shall emulate this, as it is our turn in Port Elizabeth next. I had thought that an Electricity Conference would mean leading us through the power stations and sub-stations to show us what was being done, and I was proud to think I knew that next year there will be in the process of erection, in Port Elizabeth, a station which will make Klip look like a house lighting plant!

To you, Mr. Mayor, and your Councillors, we are indeed thankful. You entertained us to lunch and other functions and I understand the ladies were swept off their feet by the entertainment and there was always someone to attend to our wishes. To the staff of the Town Clerk and the Engineers and others we are also grateful. It adds to the smooth working of the Conference when you have officials to whom you can appeal to do any work. You have already mentioned that we are obliged to the ladies —this coming out of a Conference and finding a nice cup of tea—it has been a very happy Conference in every way and I think I voice the opinion of all here that we shall carry away very, very happy memories of our sojourn in East London.

Cr. THOMPSON, Johannesburg:

On behalf of the Council Delegates I would like to associate myself with the remarks made by Cr. Erasmus. During its Centenary Year, East London has issued invitations for several Municipal Conferences to be held here and I think I can say without fear of contradiction that their tradition for hospitality has been broadcast through the Union. This has been a very enjoyable Conference and all the delegates will go away with pleasant memories of your hospitality.

Mr. RUSSELL, S.A. Institute of Electrical Engineers:

Mr. President, Mr. Mayor, Ladies and Gentlemen; I should like to say something on behalf of the South African Institute of Electrical Engineers, whom I have the privilege of representing at this Convention. The Institute has much in common with your Association, including, of course, a very large number of members who belong to both; more important still, both are founded on the general idea of service, service to the community through electricity and electrical engineering.

I said I was the representative of the South African Institute of Electrical Engineers—that is true in that I am their official representative, but the representation of our Institute at your Conventions is always considerable, and this time, perhaps, more so than ever. Apart from the fact that quite a large number of our members are present, we have the happy circumstance that you, Sir, are our Honorary Vice-President, and it is notable that this Convention has been attended by no less than five Past Presidents of the Institute.

I thank you both, on behalf of the Institute, for the invitation to send a representative to this Convention, and for

the hospitality I have received as that representative.

To you, Mr. Mayor, as the First Citizen of East London in this important year in your City's history, I bring greetings from the South African Institute of Electrical Engineers, and the hope that your second century's growth will be as steady, and as sturdy, as your first.

And to you, Mr. President, I offer the hearty congratulations of the Institute on your election as President, and their best wishes for a successful and happy year of office. Thank you, Sir.

Mr. MILL, Divisional Engineer, Post Office:

Mr. President, Mr. Mayor and Gentlemen; on behalf of that "horrible" body commonly known as the Post Office, I have had much pleasure in attending this meeting.

This is the first meeting that I have attended and when I was requested by the Postmaster-General in the person of Chief Engineer to attend, it was with some degree of trepidation. I felt like a very small Daniel being let loose among the lions in this arena!

It is my unfortunate duty to enforce the Post Office Act and the Postmaster-General's requirements in this area, so I did consider that there was a distinct possibility that I might be torn to pieces. Whether I have kept very quiet or whether, as demonstrated in these proceedings, all Town Councillors and Engineers are brothers under the skin, I have got away very lightly, for which I am very grateful. I would like to pay tribute to the excellent Papers and discussions which have been most interesting even to a light current Engineer like myself.

Mr. MILTON:

Mr. Mayor, Mr. President, Ladies and Gentlemen; it is my privilege to tender the thanks of the Electricity Supply Commission to the Association for their invitation to be represented at this Convention. I count myself doubly fortunate in that I am actually an Associate and therefore a member in my own rights.

I wish to support the thanks expressed by the previous speakers and agree with them that this has been a most enjoyable and well-managed Convention.

I will carry back to the Commission a Report of the proceedings which have been of extreme interest and value. On the social side we have been very well treated and the efforts of you, Mr. Mayor, and your Council, your President and his staff, have been appreciated from every point of view. On behalf of the Electricity Supply Commission I tender our thanks.

Mr. CLUTTERBUCK:

On behalf of the Electricity Control Board I thank you for your invitation to attend your Convention and to share the privileges accorded to delegates in the way of social events. With few exceptions I have attended your Conventions for the past 15 years and I always look forward with pleasure to the annual opopportunity of meeting the men who count in the electricity supply industry in South Africa and Rhodesia.

Mr. NIMMO, Industrial Delvelopment Corporation:

Mr. Mayor, Mr. President, Ladies and Gentlemen; on behalf of my Corporation, and of course, myself, I would like to express my appreciation of the invitation to attend this Convention.

Passing through Durban, I met a gentleman who, like Mr. Erasmus, thought that the Association of Municipal Undertakings had something to do with a dead body—I can now tell him that far from being a dead body, it is very much a live wire! I feel that the Industrial Development Corporation should keep in close touch with these Conventions and the members of your Association because I feel we can help each other tremendously in the industrial development of this country. Again, thank you very much indeed for the opportunity to attend the Convention.

Cr. HAVENGA, Potchefstroom:

Mr. Mayor, Mr. President, Ladies and Gentlemen; you must excuse my English because we are not English speaking in Potchefstroom. I must thank you very much for the way we have been treated. My Engineer when he saw these bright lights in the streets of East London, said he will bring a few to Potchefstroom to see what it is like so I warned him about the financial position. In 1912 when I was in the veld with a 1912 Ford car, a boy asked me where is the fire in this thing. So I gave him the lever and said "When I say 'press,' you press." It gave the man a good shock and I told him that is the fire of the machine, and he said "Why did you not tell me before?" So when I came to this Conference I did not know where the "fire" was and so was very careful and kept myself quiet until now that the meeting is over. I wish to thank you for all the interesting discussions we have had and also for the way we have been treated in East London by the Council and you, Sir, as President of this Convention.

Mr. SMITH, Chief Inspector of Factories:

Mr. Mayor, Mr. President, Ladies and Gentlemen; in your opening remarks asking for comments from your visitors, you referred to the Government Departments and, as the representative of the Labour Department, I feel it is my duty to rise once more,and I hope you will not think that I am unduly occupying the time of this Convention.

In my opening remarks I thanked you for the privilege of being present, and I now wish to repeat that remark doubly in the light of the experience I have had here. It has been a very valuable experience to me to come here and to take part and to listen to your deliberations, and I have come to the conclusion that these meetings are very important and that it may be a good idea to invite all the Senior Inspectors of the Department. Whether they will be allowed to come, of course, is a different story entirely, but if your Executive should decide to invite them it will at least give me a lever to try and do something about it. I think it is vital that Inspectors from the various districts should not have to wait like my friend of my left, Mr. McKenzie, for a great number of years to have the privilege to attend these valuable Conventions, because, apart from the contacts they make, it will pull them out of the grooves they are likely to get into by being stuck in one district only, and therefore, Sir, I would like to suggest, if I may, to your Executive that they consider next year inviting all the Senior Officials of the districts. If you feel that is an undue burden on your hospitality I hope you will pardon me if I have exceeded my limitations.

I am not going to make a speech but I do want to draw attention to this fact that when I came here I put on all the armour I could think of because, like my colleague from the Post Office, I expected to be attacked, and I want to particularly refer to the fact, that not once during this Convention has the Factories Act or the Machinery Regulations been attacked in any way and I feel that I must express my profound appreciation of that in that it proves to me what a wonderful spirit of co-operation there is between you Engineers, gentlemen, and the Department in its administration of the Act and the Machinery Regulations. It will be a great source of satisfaction to me to be able to report to the Department that in no one instance was the Department attacked, for which I really thank you all, and I think that in future this wonderful spirit of co-operation will continue and I want to assure you once more that I will to my utmost endeavour try to be of service to you and help you wherever I can.

The opportunity of attending this Convention and of making so many new contacts and, I hope, friends, for the future is very much appreciated. It will be almost impossible for me to visit every power station in the country during the tenure of my office and to make this personal contact which I think is so essential when it comes to solving difficulties in a co-operative and friendly spirit. I therefore repeat, gentlemen, that I am

very glad to have met so many of you, and if you in future have to refer anything to the Chief Inspector, you at least do know from this Convention what the fellow is like whom you have to deal with. On the whole, my attendance at this Convention has been an undiluted pleasure. I was put into one or two little holes but I think I wriggled out of them! In conclusion, I once again thank you for inviting me to this Convention and you Sir, Mr. Mayor, for allowing me to participate in your hospitality, and I am looking forward to the next meeting with great pleasure.

Mr. ADAMS, S.A. Broadcasting Corporation:

As this is the first occasion that the South African Broadcasting Corporation has been invited to send delegates to this Convention, I should like to take this opportunity of thanking you on their behalf and my own behalf for a very enjoyable and very interesting time.

Cr. BAXTER, Kimberley:

Mr. President, Mr. Mayor, I wish to add my congratulations to you on the success of this Convention. To we Councillor members your detailed Papers and your investigations are perhaps rather too deep to go into, but outside of that we have done more—we have made friends. Differently perhaps to some of the others —Mr. Erasmus has spent most of his time in trying to sort the amps from the KW's. On my part, I have taken the opportunity rather of meeting all the men who have been at this Convention to enable me to know what their difficulties are, and also when our turn comes to interest you in Kimberley, I shall be able to meet them as friends.

And to you, Mr. Mayor, I would like to express my thanks for the pleasant time you have given us in East London and to say that at Durban when your Councillor asked us to come here he thought that perhaps what he had promised was rather too much, but you have lived up to every word of it and we have enjoyed ourselves immensely and we hope when you come to Kimberley we will do as well, if not better. We have had the advantage of going to these other towns and getting tips as to how Conventions are made such a success, and I have learnt much that will benefit us.

Mr. GREEN, Victoria Falls and Transvaal Power Co., Ltd. and representing The S.A. Standards Institute:

On behalf of the V.F.P. I thank you for your invitation to this Conference. I found it very interesting to listen to your deliberations.

Mr. Mayor, may I thank you on behalf of myself and my wife for your very kind entertainment.

Mr. WOODS, African Cables:

Mr. President, Mr. Mayor, Ladies and Gentlemen; on behalf of the Commercial Houses represented at your Convention, I wish to express appreciation of the invitation extended to us. This has given us an opportunity of meeting members of your Association, with whom we correspond throughout the year, but often do not have the opportunity of seeing in person, and I think it is of mutual advantage for us to have had an opportunity of meeting you all at your Convention.

We have listened to your deliberations with great interest, and we have enjoyed the hospitality extended to us by your members, by your City Council and by everyone we have met in East London, and we shall take back with us very pleasing memories of this Convention. Again, Mr. President, on behalf of the Commercial Houses represented I wish to thank you all most sincerely for all your kindness.

Mr. SMITH, S.A. Cable Markers' Association:

Mr. President, Mr. Mayor, Ladies and Gentlemen; on behalf of the South African Cable Makers' Association I would like to record our thanks for the invitation given to us.

Cr. LIDDELL, Bulawayo:

Mr. Mayor, on behalf of the City of Bulawayo, Southern Rhodesia, I would like to add my thanks to you, Mr. Mayor, the Deputy Mayor and the Council for the many kindnesses you have shown us during our stay in East London.

It is unfortunate, especially for the lay-members from Southern Rhodesia, that we cannot take part to the same extent as our technical representatives can, simply because so much of your Agenda is covered by legislation which is not applicable in the Colony of Southern Rhodesia, but nevertheless, in listening to the deliberations at this Convention in that direction, I deeply appreciate the information we glean from men like Mr. Smith, Mr. Milton, Mr. Ritchie, and Mr. Clarke, and the fact that in the near future we do hope in Southern Rhodesia we will have a Factories Act makes us appreciate so much of the information we have obtained at this Convention, which will become applicable when that Act comes into force.

With regard to the Papers, we have to thank Mr. Andrew and Mr. Giles for their very excellent Papers at this Convention. I was interested in the economic side and the details which touched on the economic side of the Papers, but there again, Mr. President, I always feel that when one dabbles in economics it comes very close to the political side of things and South Africa must be very careful when touching on matters of that kind, but nevertheless I appreciated all the information I have gleaned during this Convention and will carry back to Bulawayo many happy memories of our visit to East London. I must congratulate you all, Mr. Mayor, on this your Centenary Year and I do wish East London every prosperity and much progress in its undertakings in the future.

Cr. BEZUIDENHOUT, Edenvale :

Mr. President, so far I have heard quite a number of people representing large bodies and big municipalities thanking you, but on behalf of one of the smaller Reef towns I would like to convey my thanks to you, Sir, and I can assure you that my town, although small, well appreciates what this Association is trying to do for the future of our country.

I call the town a small town but I am sure that Mr. Milton and Mr. Green will agree with me that with the geographical position of Edenvale and the fast development that is taking place at the moment, we will be placed amongst the big municipalities in the near future.

You, Mr. Mayor, and your Council I wish to thank for the hospitality to myself and our Engineer which we have received in your City. We have had a most enjoyable time and really appreciate it very much.

There is only one little thing and that is, although our town is only a small one we were far-sighted enough, I think, as we today employ not an Electrical Engineer in a dual capacity but we employ a Civil Engineer and an Electrical Engineer for the future of our town. I thank you, Sir.

Mr. R. McNALLY, S.A.R. & H.:

Mr. President, speaking on behalf of those of us on the Railway, who have been invited here to your Congress, I first of all thank you on behalf of Mr. Dalton, our Chief Electrical Engineer; Mr. McDonald, the System Manager, and myself for the invitation you sent to us and the chance of listening to your deliberations and attending the splendid entertainment arranged.

Regarding Mr. Dalton, on the Railway, even though one may be at the top of the tree, you sometimes have to take the transport the Administration can give you, because the public comes first and therefore Mr. Dalton had to leave today, as he could not get away tomorrow and perhaps for some days after.

Regarding matters, which have cropped up, we were both very pleased that there was nothing adverse that the S.A.R. was called upon to speak about. There were a number of things we could have said quite a lot about but time was fully taken

up and most likely, of what I have learnt, you will be hearing something in the form of correspondence, later on.

I think one thing we were pleased to hear is that the scope of membership is to be widened and that brings up the point Mr. Smith raised concerning Government visitors — the Administration gets invited and a senior officer from our Department attends and only at the town in which the Conference is held do you get our local System Electrical Engineers attending—in this case it is myself who has had the privilege of hearing all that has been deliberated.

The next point is what we have learnt from all this. We have learnt a lot. It is my first experience of attending this (A.M.E.U.) Conference. Councillor Erasmus has told us what his reaction is and what the reaction is on the layman, well I will tell the layman that when a technical man gets to a Conference like this, it is a case of—"the more we learn, the more we learn how little we know."

As the Conference is coming to an end, all those going home will be going by train, if they are not travelling by car and if there is anybody who has any railway trouble and require assistance, he may find me in my office, or if there are any visiting Engineers who want to contact any of our senior officers, I will be available and only too pleased to assist anyone who wants any assistance.

In this System, we contact about 30 towns and municipalities which give us a supply of current and our policy is that if we have a small power undertaking, we will be only too pleased to hand over our load to a municipality which can give us power—and now that the Commission, we are very pleased, is coming down this way we will be only too pleased to connect up with its supply as soon as and where possible.

Thank you, Mr. President, and you, Mr. Mayor, for all you have done for us while we have been here together in conference.

PRESIDENT:

If there are no further speeches Ladies and Gentlemen, I will call upon His Worship the Mayor of East London, Councillor Lazarus, to speak.

HIS WORSHIP THE MAYOR OF EAST LONDON:

Mr. President, Ladies and Gentlemen; when one opens a Conference of this nature one does it with a sense of pleasure and anticipation but when one has to participate in the concluding session one does so with a feeling of regret, because contacts have been made, friendships have been created which leaves a tinge of sorrow when they have to be broken even for a period of twelve months between Conventions.

I want to say, Mr. President, how glad we are that the success of this Convention has definitely been assured and if any of us have any doubts about the success of the Convention, the reluctance with which members appear to close the Convention is evidence of the pleasure they have derived and the satisfaction they have received in the deliberations.

If it has been a source of satisfaction to your delegates to be present in East London on this occasion during our Centenary Year, I do want to say sincerely how great a measure of pleasure and satisfaction it has been to East London in being in a position to greet all of you with that welcome which was accorded to you earlier in the week. It is highly gratifying to note that there are only something like twelve of your members absent at this concluding session and those have had to depart earlier than anticipated; I think it is very gratifying that the interest has been sustained and that so many of your visitors have been present each day, which is highly satisfactory. I think I am not being unduly eulogistic when I say one seldom has the privilege of attending a Conference when men are present whose academic and practical achievements are so distinguished. I think this is the biggest and best Convention which you have had for many years; it is highly gratifying to

all of you to know that in addition to your delegates and visitors you have had representatives from almost every Government Department—and Senior Governments—to listen to your deliberations and problems which have been raised here. I think that augurs well for the success of your Association and if we have any doubts of the benefits, I think they have been dispelled by the views shown by the members and representatives of the various organisations and departments.

I do want to express, on behalf of the citizens of East London, our deep gratitude to Mr. Russell and Cr. Liddell for the kind references made to East London and its welfare on its Centenary Year. We appreciate it immensely and we are very glad indeed that the Convention has taken place during our Centenary Year.

I don't want to detain Congress longer than is necessary but I do want to refer very briefly indeed, from the layman's point of view, to some of the matters dealt with by you. It has been clearly indicated how important it is to have closer contacts between cities, towns and smaller towns. The interchange of views and experiences between your members, be they from the large centres of Rhodesia or the Union, are extremely valuable. Every one of us can tell each other something we don't know. The experience we have is one which someone might not have had.

I was very glad indeed to note that you had the question of protection of wiring; it is the protection which is so essential and I know that will meet with the satisfaction of our communities.

It is extremely interesting to us to note the close alliance and the interest which is in evidence between yourselves and the South African Bureau of Standards and in this connection when you have effected the creation of a Safety Code, particularly in respect of domestic appliances, that again must receive the wholehearted satisfaction and acclamation of our citizens because it is a protection which must be to their benefit. The protection again under the Bureau of Standards, the protection you have against the incorrect registration of our meters is important, and there again the public is protected, and I am very glad indeed to note that the South African Bureau of Standards is endeavouring to co-operate with your organisation in that direction.

There is one bit of news I received with perhaps a little less satisfaction and that is the fact that coal has been increased to the tune of 1/3 per ton. The first question a Councillor must ask himself is to what extent does that increased cost of coal affect the generation of our current and upon the unit costs and what must we pass on to our consumers. You know how easy it is to pass on anything to your citizens!

Well, may I thank you very cordially indeed for giving me the opportunity of being present today, and may I express grateful thanks on behalf of my colleagues on the City Council for the kind remarks you made in respect of East London generally and may I express the hope that your organisation will go from strength to strength and that East London will have the privilege once more of extending to you a cordial welcome and that you will be able to say that you enjoyed yourselves in the year nineteen hundred and something as well as you did in the Centenary Year, 1948. Thank you, Mr. President.

PRESIDENT:

Mr. Mayor, Ladies and Gentlemen; thank you, Mr. Mayor, very much indeed for coming along again to the conclusion of this Convention and I trust that you have personally enjoyed this Convention as much as we have.

I thank all delegates very much indeed for the nice things that they have said and for the courtesy shown me—thereby you have made my duties very easy and very pleasant indeed.

I now declare the 22nd Convention of the Association of Municipal Electricity Undertakings closed. Thank you once again, ladies and gentlemen, for your attendance.

The Convention closed at 12.20 p.m.

SOCIAL FUNCTIONS

On the first day of the Convention a luncheon was held at Deal's Hotel, at which 270 delegates and visitors attended. This function was given by the Mayor and City Councillors of East London, at which the Mayor welcomed the delegates on behalf of the citizens of East London and Mr. Foden, the President of the Association for the ensuing year, replied.

The excellent fare provided along with good liquid refreshment put all the delegates in a happy frame of mind for the official photograph taken after lunch and this was duly reflected in the glow of satisfaction shown on the faces of the delegates assembled for the photograph.

In the evening the delegates and their friends were entertained to a cinema show at the Colosseum Theatre, East London, which was attended by approximately 200. The picture shown was "It Always Rains on Sundays"—but not at East London, as this has been a very dry City for the past few years.

On the next day, Wednesday, one of the most enjoyable afternoons was spent by a drive round the "Prince George" Circuit; this being the famous Grand Prix Motor Race Track. This function was also arranged by the City Council of East London with afternoon tea at the Leach's Bay Tea Room which is right on the sands and is one of the most popular beauty spots, thus enabling the delegates to enjoy a stroll on the beach.

On Thursday evening a grand concert was provided in the Orient Tea Room under the direction of the City's Musical Director, Mr. Lionel Field, and the items rendered were thoroughly enjoyed by all present. The refreshments provided left nothing to be desired.

During the session of the Convention the lady visitors were suitably entertained.

From the above it will be seen that the Mayor, Mayoress and City Councillors of East London excelled themselves in the hospitality extended to the delegates of the Association who must have carried away with them pleasant memories of East London's Centenary Year, and the thanks of the Association are due to the Mayor, Mayoress and all the others who so willingly assisted in entertaining the delegates. To the local manager of the South African Railways and Harbours Tourist Bureau and his staff a special vote of thanks is due for all they did to secure accommodation and transport reservations.

A word of thanks is also due to the ladies of the East London Red Cross Society for the excellent refreshments provided and served to the delegates attending the Convention meetings in the East London Wool Exchange.

In conclusion, we thank the staffs of the Town Clerk's and City Electrical Engineer's Departments for the excellent organising of the functions and in assisting in other matters appertaining to the Convention.

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